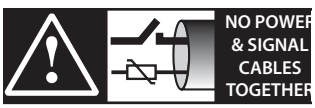
UltraCella

Electronic control for Cold Rooms

ENG User manual

LEGGI E CONSERVA QUESTE ISTRUZIONI

READ AND SAVE THESE INSTRUCTIONS



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High Efficiency Solutions

WARNING

CAREL developed its products thanks to the several years of experience in the HVAC field, continuous investment in technological innovation of the product, rigorous quality procedures and processes with in-circuit and function tests on 100% of its production, as well as the most innovative production technologies available on the market. CAREL and its branch offices/affiliates do not guarantee, in any case, that all the aspects of the product and the software included in the product will respond to the demands of the final application, even if the product is built according to state-of-the-art techniques.
The client (builder, developer or installer of the final equipment) assumes every responsibility and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment.
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- Not allow the electronic circuits getting wet. Rain, humidity and all types of liquids or condensate contain corrosive mineral substances that can damage the electrical circuits. In any case, the product should be used and stored in environments that respect the temperature and humidity limits specified in the manual;
- Not to install the device in a particularly hot environments. Temperatures that are too high can shorten the duration of the electronic devices, damaging them and distorting or melting the parts in plastic. In any case, the product should be used and stored in environments that respect the temperature and humidity limits specified in the manual;
- Not to try to open the device in any way different than that indicated in the manual;
- Not to drop, hit or shake the device, because the internal circuits and mechanisms could suffer irreparable damage.
- Not to use corrosive chemical products, aggressive solvents or detergents to clean the device;
- Not to use the product in application environments different than those specified in the technical manual.

All the above reported suggestions are also valid for the control, serial boards, programming keys or however for any other accessory in the CAREL product portfolio.
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The technical data in the manual can undergo modifications without forewarning.

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DISPOSAL

INFORMATION FOR THE USERS REGARDING THE CORRECT HANDLING OF WASTE ELECTRIC AND ELECTRONIC EQUIPMENT (WEEE)

With reference to European Parliament and Council Directive 2002/96/EC issued on 27 January 2003 and the related national implementation legislation, please note that:

- WEEE cannot be disposed of as municipal waste, said waste must be collected separately;
- the public or private waste collection systems defined by local legislation must be used. Moreover, the equipment can be returned to the distributor at the end of its working life when buying new equipment;
- this equipment may contain dangerous substances: improper use or incorrect disposal of such may have negative effects on human health and on the environment;
- the symbol (crossed-out wheeley bin) shown on the product or on the packaging and on the instruction sheet indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed of separately;
- in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

Materials warranty: 2 years (from the date of production, excluding consumables).

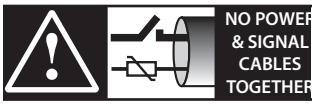
Type-approval: the quality and safety of CAREL S.P.A. products are guaranteed by the design system and ISO 9001 certified production.

HACCP: CAUTION

The Food Safety programs based on HACCP procedures and on certain national standards, require that the devices used for food preservation are periodically checked to make sure that the measuring errors are within the allowed limits of the application of use.

Carel recommends compliance with the indications of European standard "Temperature recorders and thermometers for transport, storage and distribution of chilled, frozen, deep-frozen/ quick-frozen food and ice cream – PERIODIC VERIFICATION ", EN 13486 -2001 (or subsequent updates)or similar standards and prescriptions applicable in the country of use.

The manual contains further indications regarding technical feature, proper installation and configuration of the product.



READ CAREFULLY IN THE TEXT!

WARNING: separate the probe cables and the digital input cables as much as possible from the inductive load and power cables to prevent possible electro-magnetic interference. Never introduce power cables and signal cables (including those of electric control board) into the same cable troughs.

Content

1. INTRODUCTION 7

1.1 Codes 7
1.2 Expansion modules 8

2. INSTALLATION 9

2.1 Assembly and sizes (mm) 9
2.2 Structure 10
2.3 Wiring diagram 11
2.4 Expansion modules assembly 12
2.5 Ultra EVD module 14
2.6 Ultra Power module 15
2.7 Installation 16
2.8 Connection in supervisoring network 16
2.9 UltraCella Service terminal 16
2.10 Upload/download parameters (USB memory key) 17

3. USER INTERFACE 18

3.1 Display 18
3.2 Programming 20
3.3 Procedures 22
3.4 Multifunction menu 24

4. COMMISSIONING 28

4.1 First commissioning 28
4.2 Parameters to be set for the commissioning 28
4.3 Single digit display models cod. WB000S* commissioning 28
4.4 Double digit display models cod. WB000D* commissioning 29
4.5 Commissioning with UltraCella Service Terminal 30
4.6 Main function commissioning 30
4.7 Light management 34
4.8 Other configuration parameters 34
4.9 Ultra EVD module commissioning 35

5. OUTPUTS CONFIGURATION AND PROTECTIONS 36

5.1 Analogue output 36
5.2 Digital Outputs 36

6. CONTROL 37

6.1 Switching the controller ON and OFF 37
6.2 Virtual probe 37
6.3 Set point 37
6.4 Pump down 37
6.5 Autostart in pump down 38
6.6 Continuous cycle 39
6.7 Door switch control 39
6.8 Defrost 39
6.9 Evaporator Fans 41
6.10 Condenser fans 42
6.11 Duty setting 43
6.12 Bowl resistance 43
6.13 Defrosting with 2 evaporators 43
6.14 Second compressor with rotation 43
6.15 Humidity management 45

7. PARAMETERS TABLE 47

8. SIGNALS AND ALARMS 51

8.1 Signalling 51
8.2 Alarms 51
8.3 Reset alarms 51
8.4 HACCP alarms and display 51
8.5 EVD EVO alarms 52
8.6 Alarm parameters 54
8.7 HACCP Alarm parameters and monitoring activation 54
8.8 High condenser temperature alarm 55

9. TECHNICAL SPECIFICATIONS 56

9.1 UltraCella technical characteristics 56

1. INTRODUCTION

Ultracella is a family of products consisting of a control system for the basic functions of a cold room to which can be added further modules for accessory functionalities (e.g. electronic valve, power relays, etc.).

The user interface ensures ease in use and it consists, depending on the models, of:
- wide led display on which can be viewed the operating temperature and the active loads;
- a graphic terminal with text strings in multiple languages, which guide the user during commissioning (wizard). It is also equipped with contextual help menus accessible during programming, that provide an accurate description of the alarms.

The graphic terminal is also available as a "service tool", which is useful when the control has the only LED interface.

UltraCella has a port for the insertion of a USB memory key to:
- load the languages for the graphic terminal during the first commissioning;
- parameters upload/download;
- other operations reserved for the service centre (e.g. software update);
- download log of temperature recorded.

When mounting the optional modules are matched to the right of the main control system and connected to it with watertight coupling, to ensure the IP degree of protection of the assembly.

Main characteristics:
- 6 relay outputs: compressor, defrost, fan, light, AUX1, AUX2;
- assembly on guide DIN or wall;
- LED board with bright display with 3 digits, with decimal point and icons that indicate the operating status;
- integration of the keys in the front panel (LED board) to ensure a high degree of protection (IP65) and safety during operation and cleaning;
- availability of 10 sets of parameters (recipes) preloaded by CAREL but modifiable, corresponding to the same number of parameters configurations, to adapt the control to the specific conservation needs required by the cold room;
- navigation on intuitive user interface with contextual backlight keyboard;
- defrost can be driven using the keyboard, digital input and supervisor;
- various types of defrost managements, on one or two evaporators: natural (with stop compressor), resistance, hot gas;
- control of compressors with up to 2 Hp or up to 3 Hp with the accessory power module;
- temperature control with virtual adjustment probe;
- digital inputs that can be configurated for alarm activation, enabling or activating defrost, door switch, auxiliary output, on / off, etc;
- control of 1 compressor with double step or of two compressors, even with rotation;
- keyboard safety: operation of the single keys can be disabled to avoid tampering;
- light management by door switch or dedicated key;
- alarm buzzer;
- HACCP function: temperature monitoring and adjustment in case of alarm due to high temperature during operation or after black out;
- RS485 network connection for remote monitoring and supervision sytems.

The accessory modules allow:
- the installation of the electronic expansion valve, using the module with CAREL Evd Evolution driver dedicated to the control of superheat;
- compressor control with power relay of up to 3 Hp;
- the use of a single-phase circuit breaker switch in addition to the power relay.

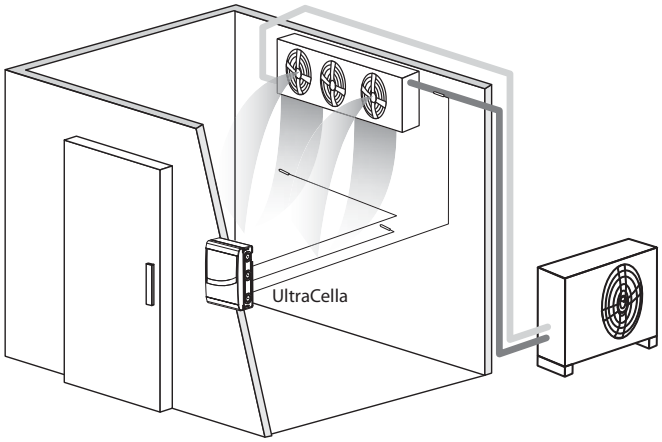


Fig. 1.a

1.1 Codes

Codes	Description
WB000S**F0	UltraCella, led display with single row
WB000D**F0	UltraCella, led display with double row

Tab. 1.a

Fig. 1.b

Fig. 1.c

1.2 Expansion modules

EVD Module (cod. WM00E***00)

Expansion module containing the supply transformer and the driver EVD Evo to control the electronic expansion valve.

Codes	Description
WM00ENSI00	Ultra EVD Module with EVD I/E display
WM00ENNI00	Ultra EVD Module "blind" - commissioning through UltraCella

Tab. 1.b

Fig. 1.d

Fig. 1.e

Power module (cod. WM00P000*N)

Expansion module that contains the circuit breaker switch and 3 Hp relay for compressor control. There is also a version without relay, to give way to the installer to insert devices suitable for the application (contactors, safety devices, etc.)

Codes	Description
WM00P0003N	Ultra Power Module main switch and 3HP relay
WM00P000NN	Ultra Power Module main switch

Tab. 1.c

Fig. 1.f

UltraCella Service Terminal (cod. PGDEWB0FZ0)

The UltraCella control can be connected to an external terminal, without having to open the unit, for easy commissioning and programming of the control parameters, to be used with the controls having LED display. When connecting the UltraCella Service Terminal the LED interface is temporarily disabled.

Fig. 1.g

2. INSTALLATION

2.1 Assembly and sizes (mm)

The control system has holes on the lower and right side, in which the installer can insert the cable glands.

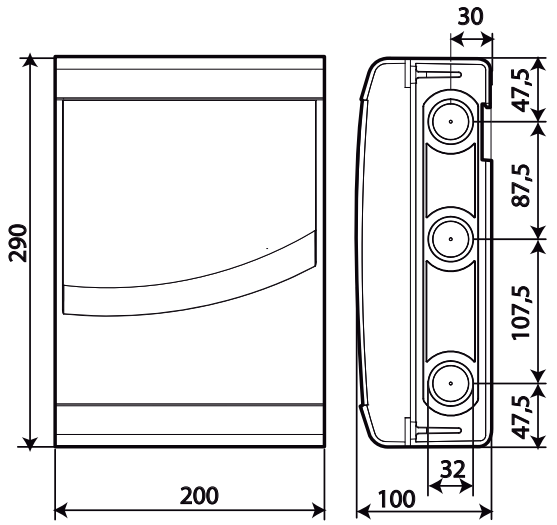


Fig. 2.a

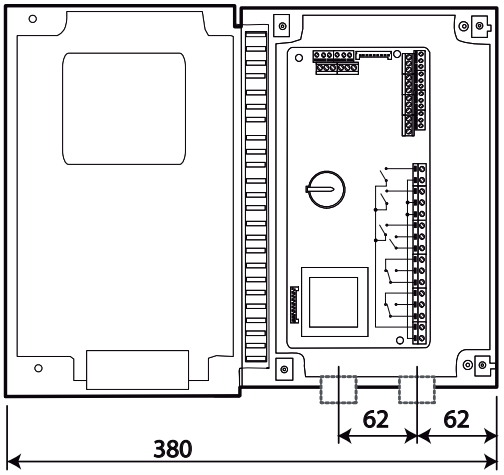
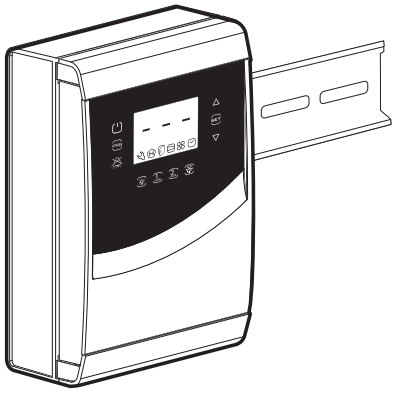


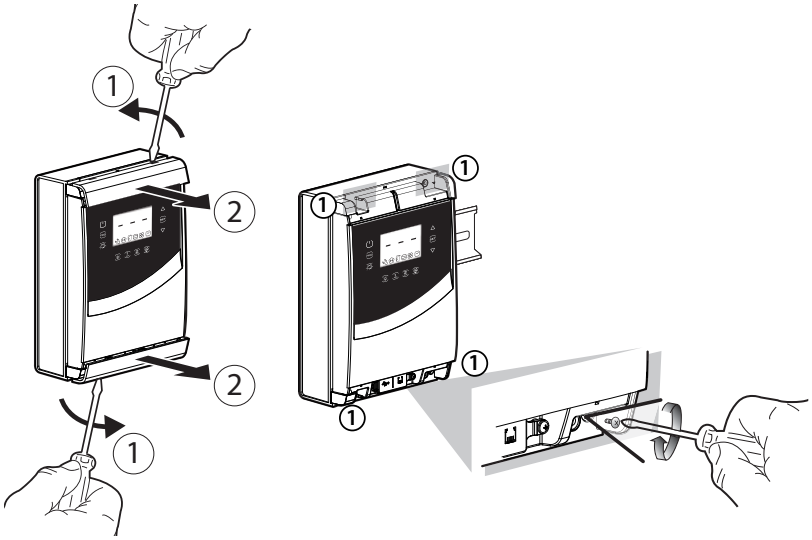
Fig. 2.b

Mounting

A: with DIN rail

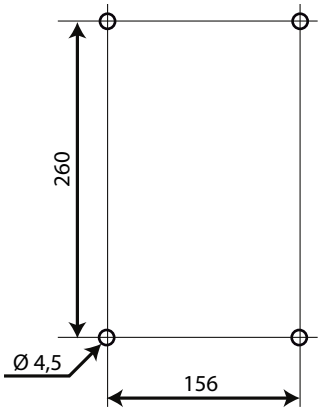


1.a: Fix the DIN rail and insert the controller

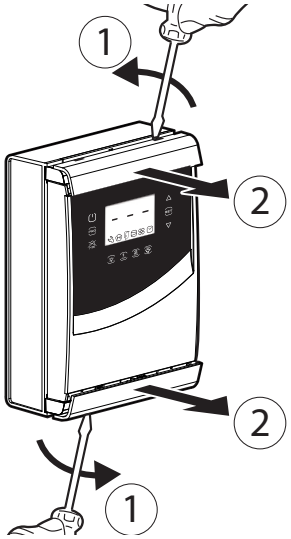


2.a: Remove the frames, loosen the screws (1) and open the panel

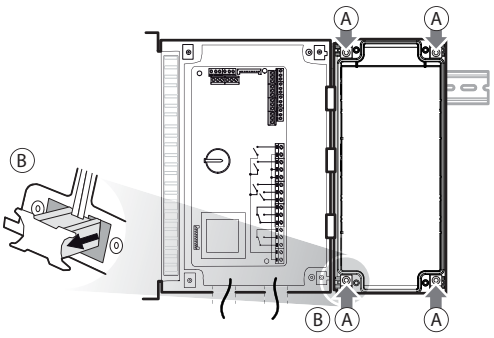
B: without DIN rail



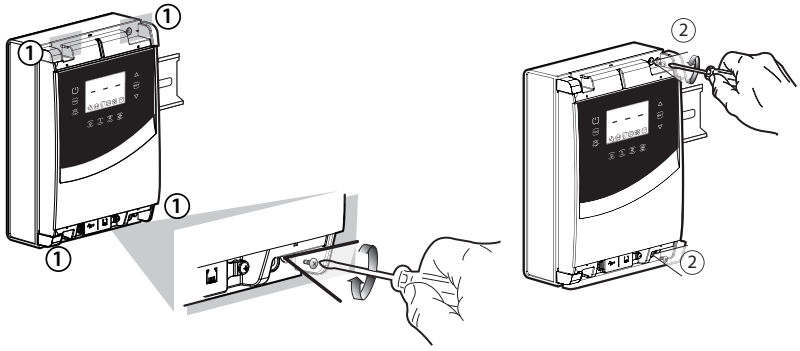
1.b: Make 4 holes (Ø 4,5 mm) according to the drilling template and insert thr dowels (mm)



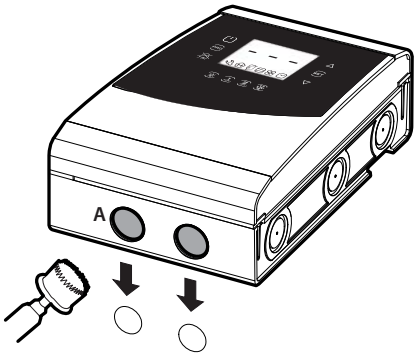
2.b: Remove the frames



3.a: Mark on the wall the positions of the lower holes, remove the panel and perform the drills (Ø 4.5 mm); insert the plugs. Replace the panel on the DIN guide and fix it fastening the lower screws.

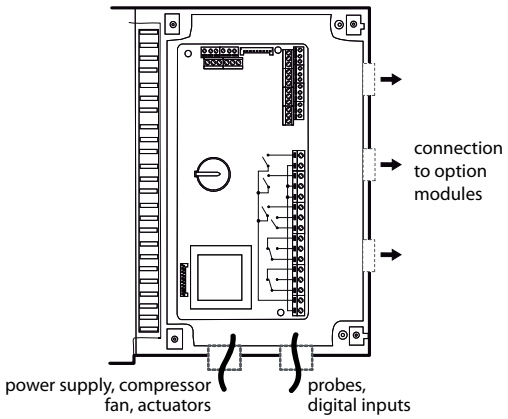


3.b: Fasten the screws (1) and fix the panel. Loosen the screws (2) and open the panel.



4: Use the holes and mount the cable glands to connect:
- on the lower side: supply cables, probes, actuators;
- on the right side: cables for the connection of accessory modules;

5: Close the panel fastening the screws (2).



Caution: separate the power cables (supply, actuators) from the signal cables (probes, digital inputs).

Note: use a hole saw to drill the knock-outs (A).

2.2 Structure

Models with single digit display cod. WB000S*

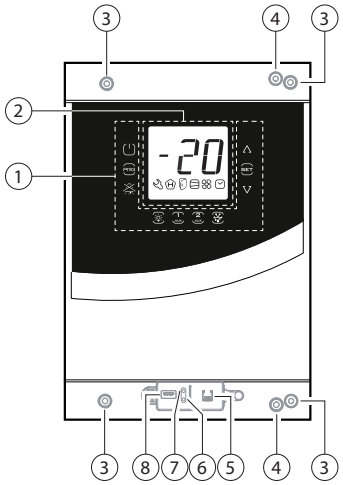


Fig. 2.c

Key

1	Keyboard
2	Display
3	Wall mounting holes
4	Locking screws
5	Connector for UltraCella Service (*)
6	Green LED (*)
7	Red LED (*)
8	USB Port (*)

(*) Visible after removing the bottom frame

Models with double digit display cod. WB000D*

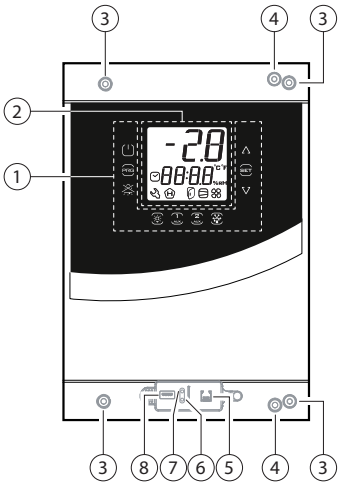


Fig. 2.d

Key

1	Keyboard
2	Display
3	Wall mounting holes
4	Locking screws
5	Connector for UltraCella Service (*)
6	Green LED (*)
7	Red LED (*)
8	USB port (*)

(*) Visible after removing the bottom frame

2.3 Wiring diagram

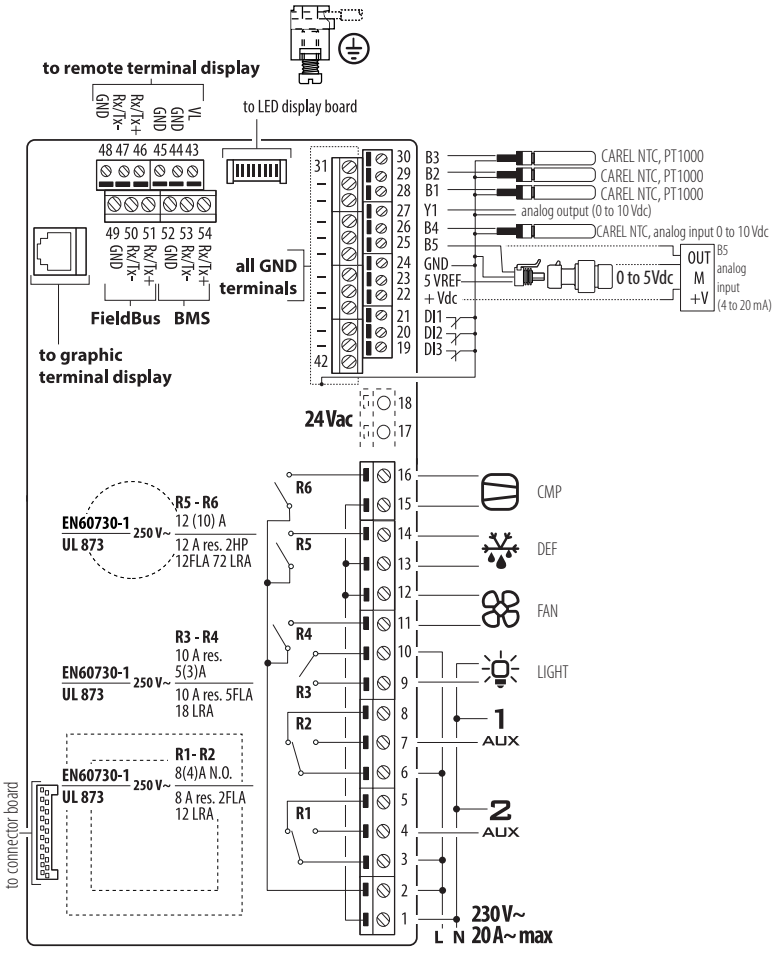


Fig. 2.e

Key

B1…B5	Analogue inputs 1…5	
DI1	Door switch	
DI2, DI3	Digital inputs 2, 3	
Y1	0…10 V analogue output	
GND	Grounding for signals	
5 VREF	Ratiometric pressure probe power supply	
+Vdc	Active probe supply (humidity)	
CMP	DO1 (*)	Compressor
DEF	DO2 (*)	Defrost
FAN	DO3 (*)	Evaporator fan
LIGHT	DO4 (*)	Light
AUX1	DO5 (*)	Auxiliary output 1
AUX2	DO6 (*)	Auxiliary output 2
L, N	Power Supply	
Fieldbus	Fieldbus Serial	
BMS	BMS Serial	

Tab. 2.a

(*) Digital outputs display in the multifunction module (see chap. 3).

2.4 Expansion modules assembly

Dimensions (mm)

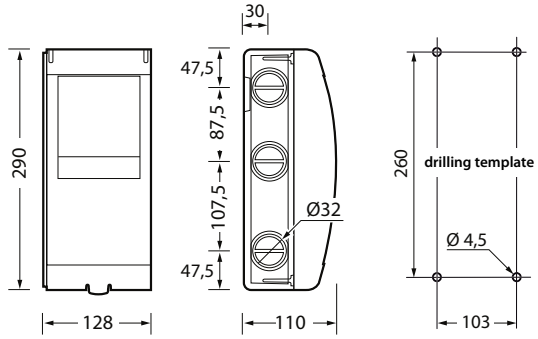


Fig. 2.f

Overall drilling template (mm)

If UltraCella and expansion modules have to be mounted at the same time, use the overall drilling template.

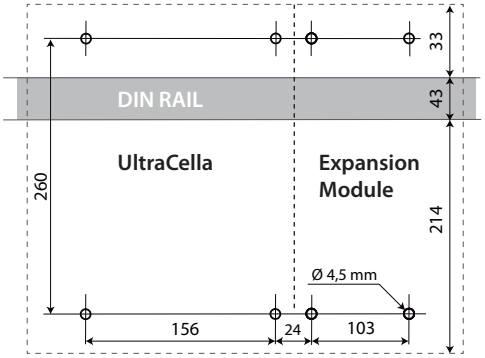


Fig. 2.g

Layout

If more than one expansion modules it is to assemble, use the arrangement of figure to optimize the wiring.

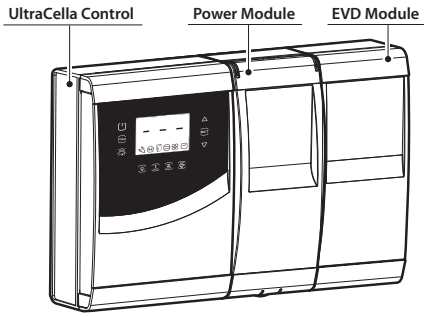
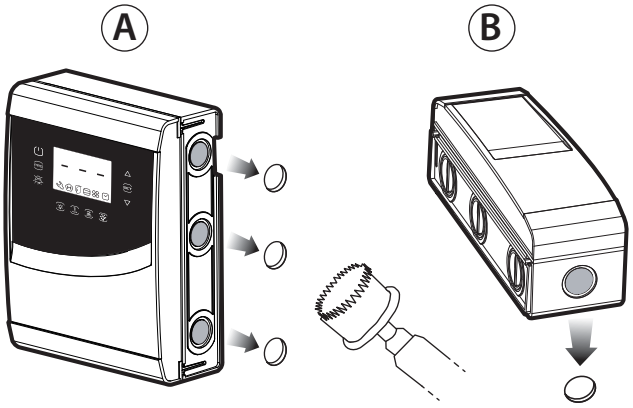
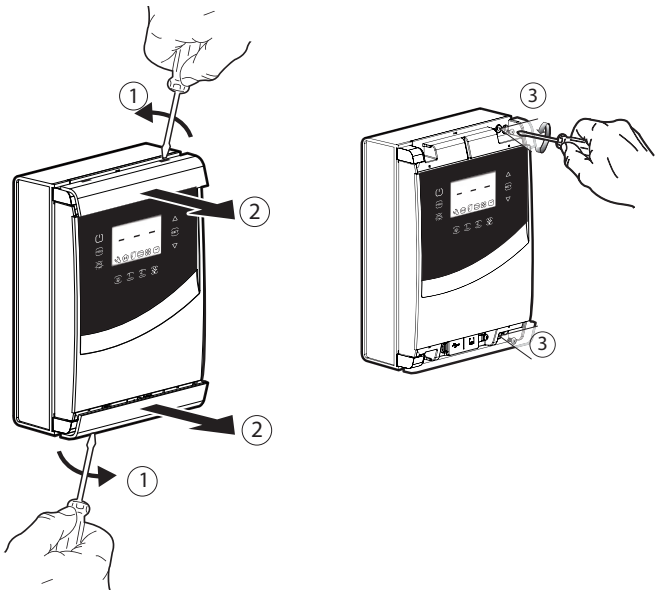


Fig. 2.h

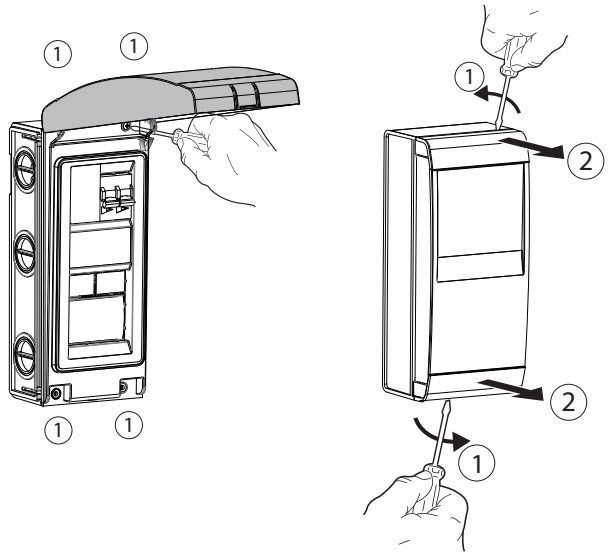
Mounting



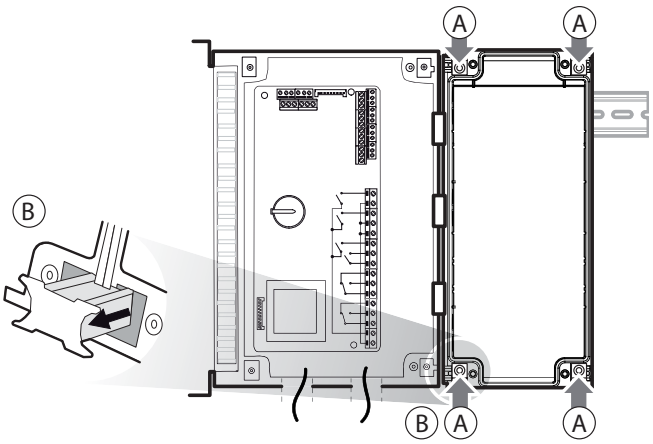
1: Use a hole saw to drill the panel in correspondence with the predrilled holes (steps A, B). If present, fasten the DIN rail for the module.



2: Remove the faceplates. Unscrew the screws (3) and open the UltraCella control



3: Raise the cover or remove the faceplates and unscrew the screws to remove the panel and open the module.



4: Put the module close to UltraCella control and insert the coupling clamps supplied as standard.

2.5 Ultra EVD module

Mounting with DIN rail

5.a Mark the positions of the bottom holes on the wall (A), remove the coupling clamps (B), extract the module (C). Drill the corresponding holes (Ø 4,5 mm) and insert the anchors. Place again the module: mount the coupling clamps (B) and fasten the screws (A).

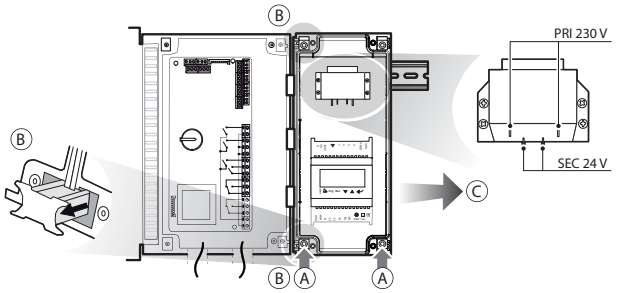


Fig. 2.i

Mounting without DIN rail

5.b Mark the positions of the 4 holes (A), remove the coupling clamps (B), extract the module (C). Drill the corresponding holes (Ø 4,5 mm), depending on drilling template and insert the anchors. Place again the module: mount the coupling clamps (B) and fasten the screws (A).

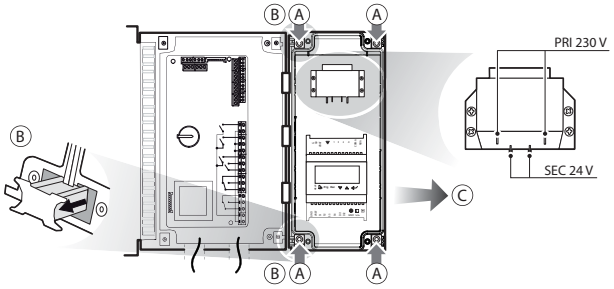


Fig. 2.j

Connect electrically the mudule wiring according to the diagram.
The EVD EVO driver is connected to UltraCella via Fieldbus serial line (automatic identification). When connected, it is necessary to proceed with the activation of the driver (set the parameter P1=1 in UltraCella)

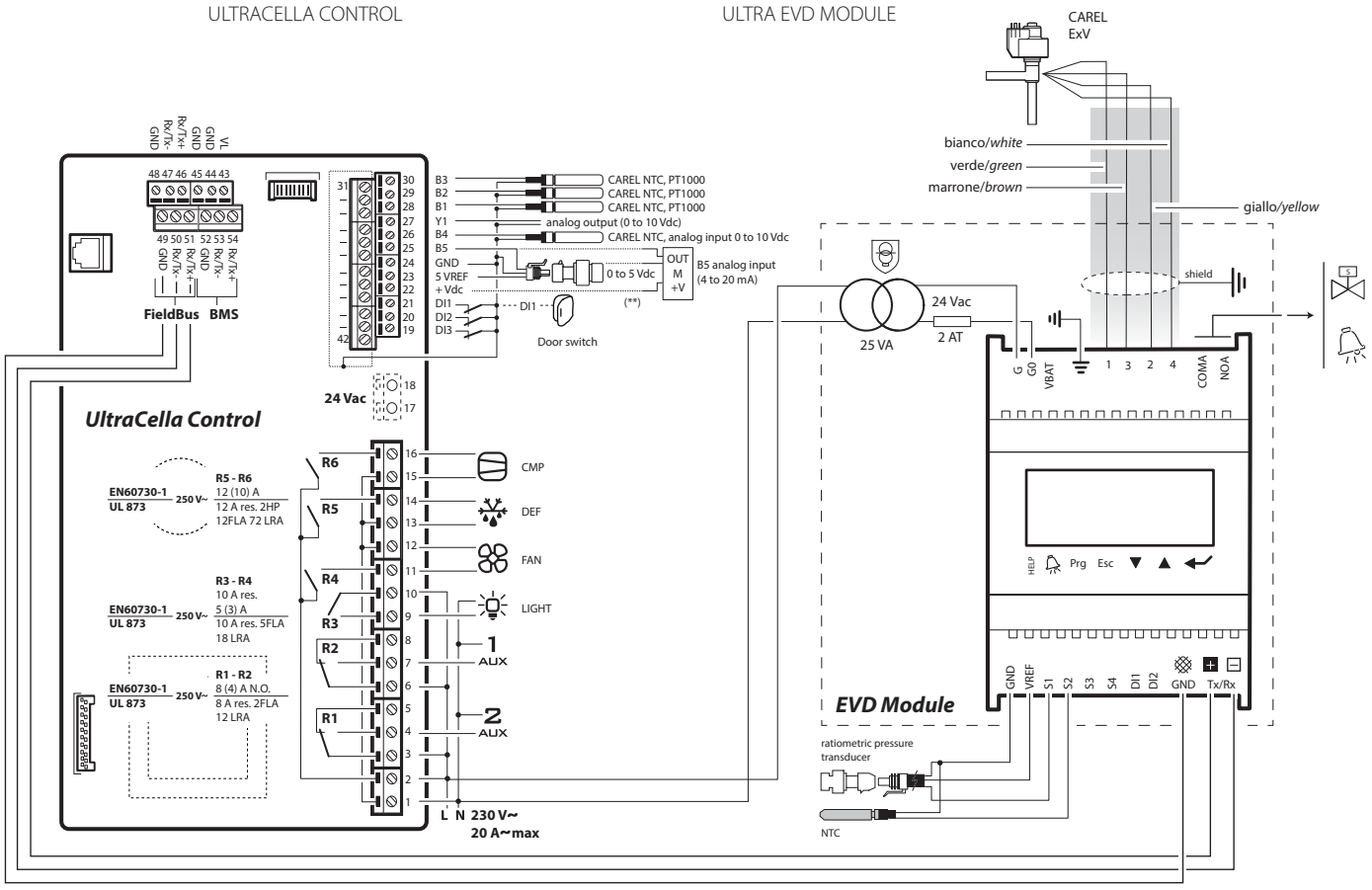


Fig. 2.k

2.6 Ultra Power module

Mounting with DIN rail

5.a Mark the positions of the bottom holes (A), remove the coupling clamps (B), extract the module (C). Drill the corresponding holes (Ø 4,5 mm) and insert the anchors. Place again the module: mount the coupling clamps (B) and fasten the screws (A).

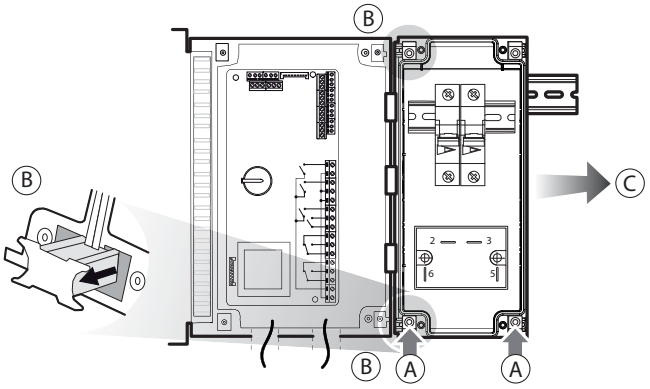


Fig. 2.l

Mounting without DIN rail

5.b Mark on the wall the positions of the 4 holes (A), remove the coupling clamps (B), extract the module (C). Drill the corresponding holes (Ø 4,5 mm), depending on drilling template and insert the anchors Place again the module: mount the coupling clamps (B) and fasten the screws (A).

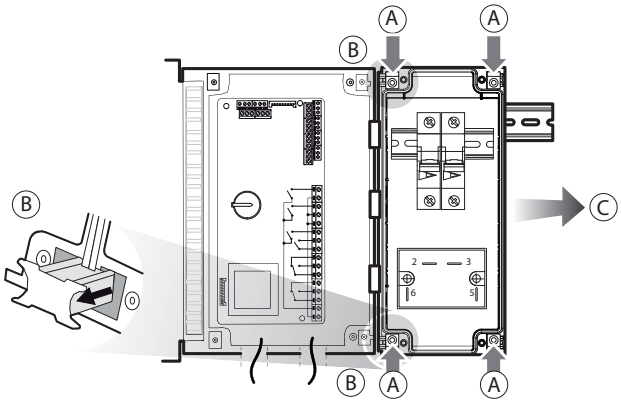
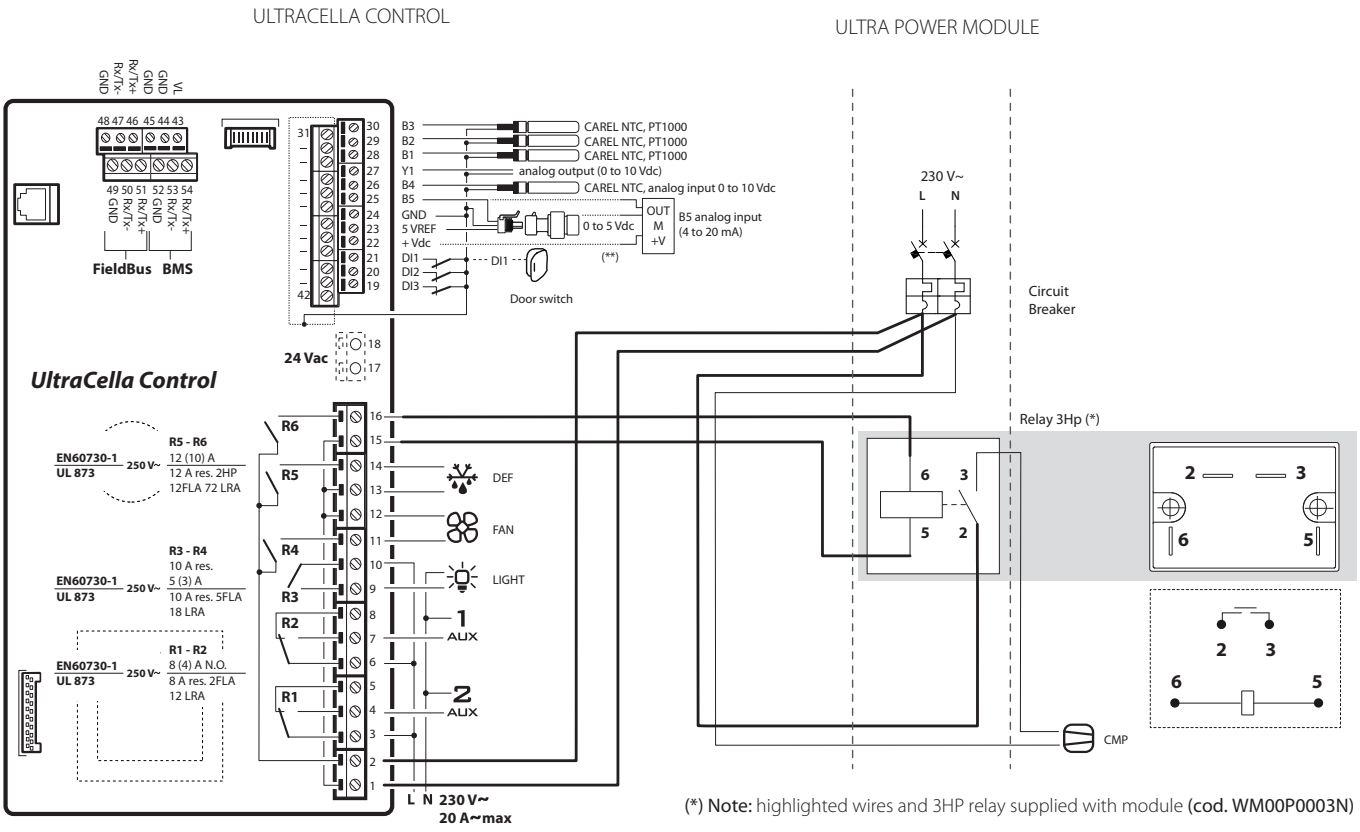


Fig. 2.m

Connect electrically the mudule wiring according to the diagram.



(*) **Note:** highlighted wires and 3HP relay supplied with module **(cod. WM00P0003N)**

Fig. 2.n

2.7 Installation

Proceed as follows for installation, making reference to the wiring diagrams in the previous paragraphs:

1. Connect the supply and probes: the probes can be remote-controlled up to a maximum distance of 10 metres from the controller as long as cables with minimum section of 1 mm^2 are used.
2. Program the control: as indicated in chapter "Commissioning" and "User interface";
3. Connect the actuators: the actuators should only be connected after having programmed the controller. It is recommended to carefully evaluate the maximum capacities of the relays indicated in table "Technical specifications".
4. Connection to the serial network (if present): all controls are fitted with a serial connector for connection to the supervisory network.

Warnings: avoid installing UltraCella control system in environments with the following characteristics:

- relative humidity over 90% non-condensing;
- strong vibrations or knocks;
- exposure to continuous jets of water;
- exposure to aggressive and polluting atmospheric agents (e.g.: sulphur and ammonia gases, saline mist, smoke) to avoid corrosion and/or oxidation;
- high magnetic and/or radio frequency interference (e.g. near transmitting antennas);
- exposure of the control system to direct sunlight and atmospheric agents in general.

The following recommendations must be respected when connecting the controllers:
warnings:

- incorrect connection of the power supply may seriously damage the control system;
- use cable ends that are suitable for the terminals. Loosen every screw and fit the cable end, next tighten the screws and gently pull the cables to check their tightness. If using an automatic screwdriver, adjust the torque to a value less than 0.5 N · m;
- separate as much as possible (by at least 3 cm) the probe signal and digital input cables from inductive loads and power cables, to avoid any electromagnetic disturbance. Never lay power cables and probe cables in the same cable conduits (including those for the electrical panels). Do not install the probe cables in the immediate vicinity of power devices (contactors, circuit breakers or other). Reduce the length of the sensor cables as much as possible, and avoid spirals around power devices;
- only use IP67 guaranteed probes as end defrost probes; place the probes with the vertical bulb upwards, so as to facilitate drainage of any condensate. Remember that the thermistor temperature probes (NTC) have no polarity, so the order of connection of terminals is not important.

⚠ **Caution:** in order to ensure the safety of the unit in the event of serious alarms, all the electromechanical safety devices required to guarantee correct operation must be fitted on the unit.

HACCP - CAUTION

When the temperature measurement is relevant for Food Safety (see HACCP), will be used only temperature probes suggested by Carel. The standards in force may require the compilation and preservation of appropriate documentation, as well as periodic checks on instrumentation and sensors. If in doubt, consult the person in charge of food safety or the manager of the plant.

2.8 Connection in supervisoring network

Warnings:

- properly fix the converter to avoid disconnections;
- perform the wiring without power supply;
- keep the cables of the converter CVSTDUMOR0 separate from power cables (supply and relay outputs).

The RS485 converter allows you to connect to the UltraCella control network to the monitoring network for complete control and monitoring of controls connected. The system provides a maximum of 207 units with a maximum length of 1000 m. For the connection it is requested the accessory standard (RS485-USB converter cod. CAREL CVSTDUMOR0) and a terminating resistor of 120 Ω to be placed on the terminals connected to the last control. Connect RS485 converter to the controls as shown in the figure. For assigning the serial address see the parameter H0. See the instruction sheet of the converter for further information.

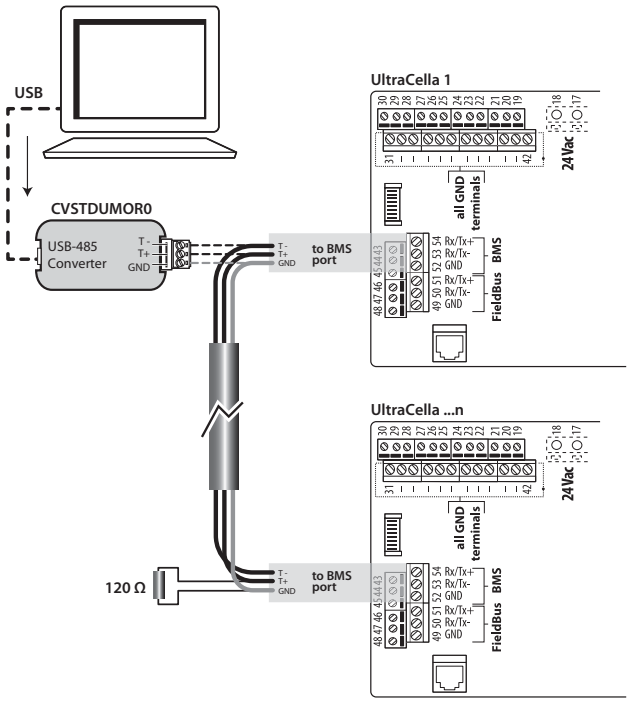


Fig. 2.o

UltraCella can be connected to both PlantVisor and PlantWatch via BMS port (RS485 Carel protocol)

2.9 UltraCella Service terminal

The UltraCella Service Terminal has to be connected via a dedicated connector, that can be accessed after removing the lower frame
Using the "UltraCella Service Terminal" you can:

- during the first commissioning: insert the first configuration parameters following the guided procedure (wizard);
- during normal operation:

1. display the active loads and the main variables: temperature, humidity;
2. perform the control programming, facilitated by contextual help.

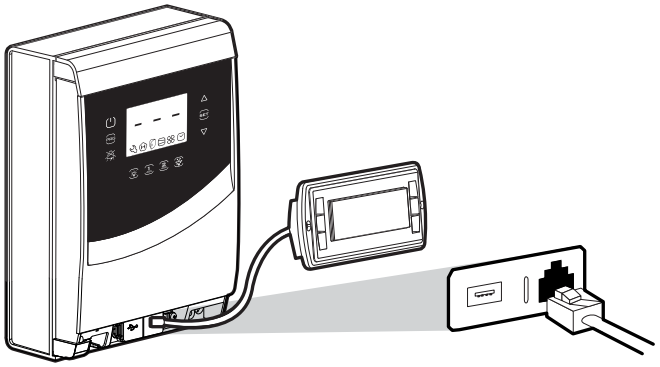


Fig. 2.p

2.10 Upload/download parameters (USB memory key)

The USB memory key must be placed in the connector accessible after removing the lower frame. Using the USB memory key you can:

1. download the parameters set (r01...r10): control saves inside the key the 10 parameters set;
2. upload the parameters set (r01...r10): control loads from the key the 10 parameters set);

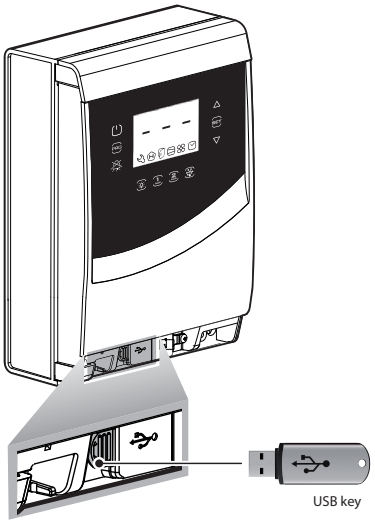
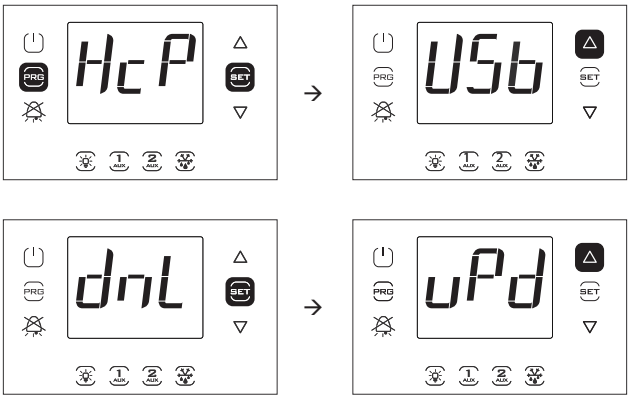


Fig. 2.q

Procedure:

1. remove the lower frame and insert the USB memory key. The red and green LED beside the key will light up once in sequence to indicate the recognition by the unity of the USB memory key;
2. bring the control to OFF to upload (to copy the configurations from the USB key to the controller); to download (to copy the configurations from the controller to the USB key), the controller can be in ON status;
3. press at the same time Prg and Set for 2 s and access the multifunction menu: the message "HcP" will appear;
4. press "UP" until reaching the entry "USb";
5. press "Set";
6. choose whether you want to DOWNLOAD the parameters (= dnL), to UPLOAD them (=uPd) or to exit the page (EXt);
7. press "Set"; the green LED will light up and will remain lit to indicate that the upload / download of parameters occurred; if, for some reason, the procedure should not be successful, the red LED will turn on;
8. extract the key. The LED turns off. The file is ".txt"type, and it can be displayed on the computer.



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "USB device" on the second row.

3. USER INTERFACE

The front panel contains the display and keyboard, made up from 10 or 11 keys (depending on the model), which, pressed individually or together, allow to perform all of the controller programming operations. The accessory UltraCella Service terminal, accessory terminal, allows the commissioning of the control system via a guided procedure (Wizard) and also programming the parameters with a contextual help that explains the various functions.

3.1 Display

On the LED display is shown the temperature range from -50 °C (-58 °F) to +150 °C (302 °F). The resolution of the tenth for temperatures in the range -19,9…99,9. In case of alarm the value of the probe is displayed in alternance with the codes of the active alarms. During programming, it displays the codes that identify the parameters and their value.

Note: you can select the standard display by properly configuring parameter /t1 (/t1 and /t2 for double digit models).

Front panel for single row display models cod. WB000S*

Fig. 3.a

Front panel for double row display models cod. WB000D*

Fig. 3.b

UltraCella Service Terminal (accessories)

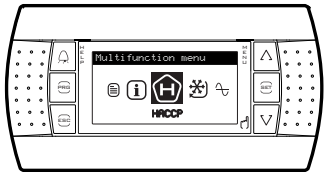


Fig. 3.c

Icons table on models with single row display P/Ns WB000S*

Icon	Function	Normal operation			Note
		ON	OFF	Flashing	
	Technical support			Alarms, for example alarm due to EEprom or probe fault	Serious problem detected. Please contact technical service
	HACCP	HACCP function enabled	-	HACCP alarm saved (HA and/or HF)	
	Door	Door open	Door Close	Door open and door alarm active	
	Compressor	On	Off	Waiting for activation	Blinks when the activation of the compressor is delayed by safety times.
	Fan	On	Off	Waiting for activation	Blinks when the activation of the compressor is delayed by safety times.
	Clock	On if a scheduled defrost is requested			

Tab. 3.a

Icons table on models with two rows display P/Ns. WB000D*

Icon	Function	Normal operation			Note
		ON	OFF	Flashing	
	Technical support			Alarms, for example alarm due to EEprom or probe fault	Serious problem detected. Please contact technical service
	HACCP	HACCP function enabled	-	HACCP alarm saved (HA and/or HF)	
	Door	Door open	Door Close	Door open and door alarm active	
	Compressor	On	Off	Waiting for activation	Blinks when the activation of the compressor is delayed by safety times.
	Fan	On	Off	Waiting for activation	Blinks when the activation of the compressor is delayed by safety times.
	Clock	On if a scheduled defrost is requested			
°C	Celsius degrees	Temperature visualization in Celsius degrees	-	.	
°F	Farenheit degrees	Temperature visualization in Farenheit degrees	-		
%RH	humidity percentage	Humidity visualization	-		

Tab. 3.b

3.1 Keyboard

Key	Normal operation		Blink
	Pressing the individual key	Combined pressure with other keys	
On/Off	• Pressed for 2 s, turns the control OFF • Pressed for 2 s, turns the control ON		
PRG	• ESC function, return to higher level • Pressed for 2 s, enters the programming menu	Prg + Set: if pressed at the same time for 2 s, allow access to the multifunction menu	
ALARM	• In case of alarm: mutes the audible alarm (buzzer) and deactivates the alarm relay • Pressed for 2 s, reset the manual reset alarms		Available only in case of alarm
	• Turns the light on/off		
1 AUX	• Turns auxiliary output 1 on/off (*)		
2 AUX	• Turns auxiliary output 2 on/off (*)		
DEF	• Activates/deactivates manual defrost		Waiting for activation
SET	• Set point setting • Value setting	Prg + Set: if pressed at the same time for 2 s, allow access to the multifunction menu	
UP/DOWN	• Value increase/ decrease		

Tab. 3.c

(*) Set H1/H5=2. If parameters are not set, if AUX1/AUX2 key are pressed, they blink for 5 seconds.

3.2 Programming

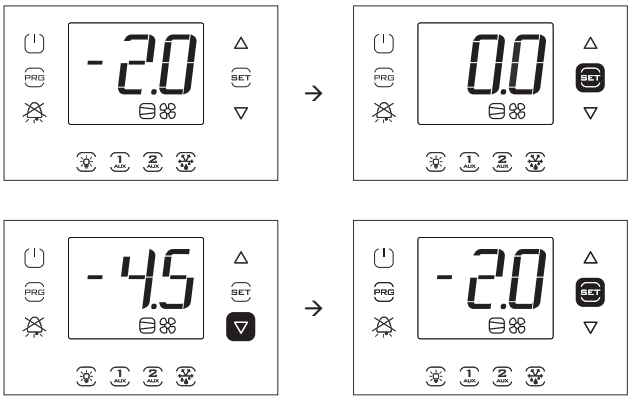
The parameters can be modified using the keyboard. Access to the configuration parameters is protected by a password that prevents unwanted modifications or access by unauthorised persons. With the password you can access and change all the parameters of the control.

Note: in the LED display model the keys are illuminated according to the menu where the user is operating, in order to facilitate navigation.

3.2.1 Changing the set point

In order to change the set point St (default =0°C):

1. the control system displays the standard display visualization;
2. press Set for 2 s: on the display appears the current value of the set point;
3. press UP/DOWN to reach the desired value;
4. press Set to confirm the new set point value. The control returns to standard display visualization.

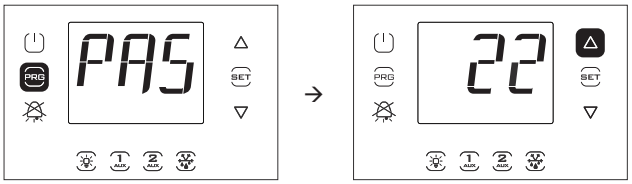


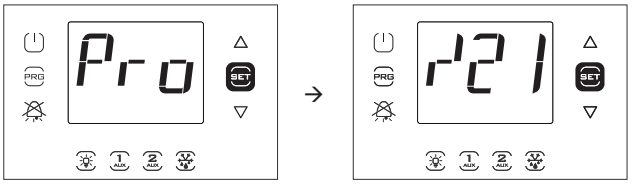
Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "Setpoint" on the second row

3.2.2 Modification of the parameters (for models with single digit display cod. WB000S*)

Procedure:

1. to modify the parameters, first switch the controller OFF (press ON/OFF button);
2. press Prg for 2 s: on the display appears the message "PAS" - password request;
3. press UP/DOWN and insert the password: 22. If you press Set, the code of the first parameters category will appear: Probes (see the following table and parameters table);
4. press Set: the first parameter of the category will appear: /21;
5. press UP/DOWN until reaching the parameter to be modified;
6. press Set key to display the parameter value;
7. press UP/DOWN to reach the desired value;
8. press Set to confirm the new value and return to parameter code display;
9. repeat the operations from 5) to 8) to change other parameters;
10. press Prg to return to higher level of the parameters categories and UP/DOWN to pass to the next category: CtL. Repeat steps from 4) to 8) to access the category and change other parameters;
11. press one or more times Prg to exit the parameters modification procedure and return to standard display visualization.





Note: in the parameters or set point modification procedures, the new value is saved every time the Set key is pressed.

Category	Text
Probes	Pro
Control	CtL
Compressor	CMP
Defrost	dEF
Alarms	ALM
Fan	FAn

Category	Text
Configuration	CnF
HACCP	HcP
Clock	rtc
Door and light	doL
Recipes	rcP
Valve	Eud

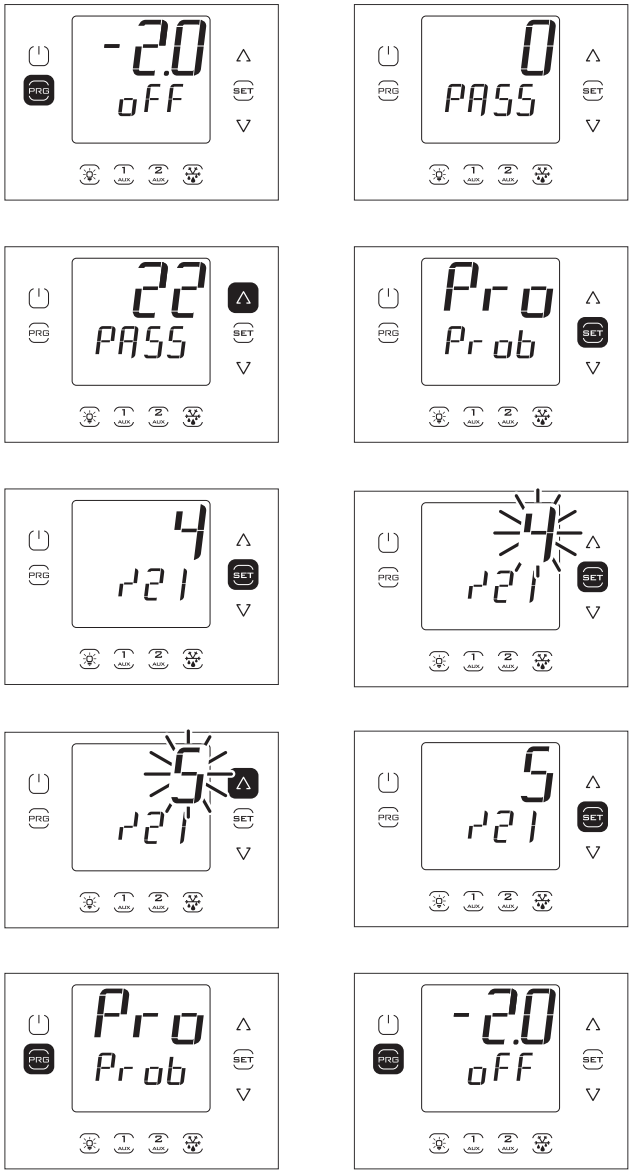
Tab. 3.d

Note: if no key is pressed, after about 120 s the control automatically returns to standard display..

3.2.3 Modification of the parameters (for models with double digit display cod. WB000D*)

Procedure:

1. to modify the parameters, first switch the controller OFF (press ON/OFF button);
2. press Prg for 2 sec: the second row of the display will show "PASS" (password required);
3. press UP/DOWN to enter the password: 22;
4. press Set; the second row of the display will scroll the name of the first category of parameters: Probes (see the previous table and the parameter table);
5. press Set: the second row of the display will scroll the code and description of the first parameter in the category: /21 – Probe1 meas. stab.; the first row of the display will show the current value of the parameter;
6. press Set: the value on the first row of the display flashes, to indicate that the value can be modified;
7. press UP/DOWN until reaching the desired value;
8. press Set to confirm the new value; the value will stop flashing;
9. press UP/DOWN to scroll the other parameters;
10. repeat steps 6) to 9) to modify other parameters;
11. press Prg to return to the top level of parameter categories, or UP/DOWN to move the next category: CtL (Control). Then repeat steps from 5) to 9) to access the category and modify other parameters;
12. press Prg once or more than once to exit the parameter setting procedure and return to the standard display.



Note: in the parameters or set point modification procedures, the new value is saved every time the Set key is pressed.

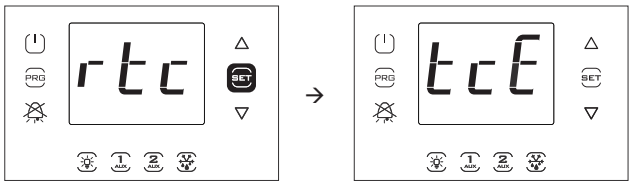
Note: if no key is pressed, after about 120 s the control automatically returns to standard display.

3.2.4 Example 1: current date/time setting

Procedure:

1. access the parameters modification menu as described in the relative paragraph;
2. enter category "rtc";
3. select parameter "tcE" and set it to 1 to enable the date exchange;
4. press UP 2 times and then set the parameters regarding the year (Y), month (M), day of the month (d), hour (h), minutes (n) (see table below);
5. press UP, select tct parameter and set it from 0 to 1 or from 1 to 0 to perform the data/ time change;
6. select again parameter tcE and set it to 0;
7. press one or more times Prg to save the date/ time and return to standard display.

Par.	Description	Def	Min	Max	U.M.
tcE	Enabling date modification procedure 0/1=No/Yes	0	0	1	-
tcT	Date/ time change Action on change 0→1 or 1→0	0	0	1	-
y__	Date/ time: year	0	0	37	-
M__	Date/ time: month	1	1	12	-
d__	Date/ time: day of the month	1	1	31	-
h__	Date/ time: hour	0	0	23	-
n__	Date/ time: minute	0	0	59	-



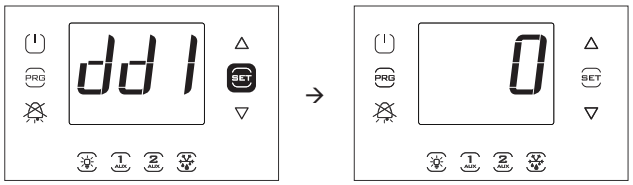
Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows with a scrolling message, parametercode and description: "tce - enable data modification".

3.2.5 Example 2: set the scheduled defrosting periods

Procedure:

1. access the parameters modification menu as described in the relative paragraph;
2. enter category "rtc";
3. press UP and select the parameters "ddi (i = 1…8") to select the frequency of the ith defrost, based on the indications in the table below;
4. press UP and pass to the defrost hour and minute;
5. press once or more times Prg to save and return to standard visualization.

0	ith defrosting disabled
1…7	Monday…Sunday
8	From Monday to Friday
9	From Monday to Saturday
10	Saturday and Sunday
11	Daily



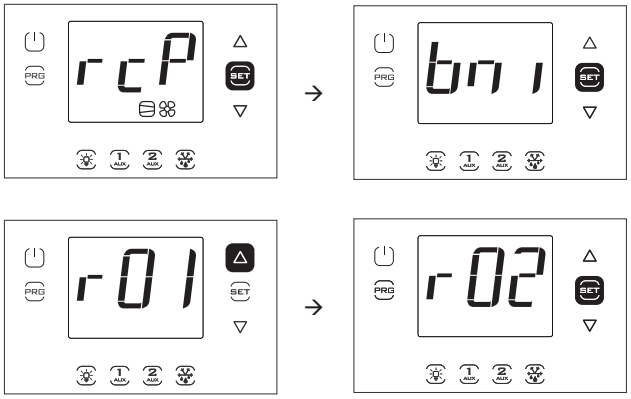
Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows with a scrolling message, parametercode and description: "dd1 - defrost1-day"

3.3 Procedures

3.3.1 Parameter set selection

The control can work with 10 sets of parameters, pre-set in the factory by Carel, but modifiable to suit your requirements, indicated with r01 r10 (recipe 1 ... recipe 10);
In order to select the current parameters set (control in OFF):

1. from parameters modification menu, access the category "rcP" and press Set; the message "bni" will appear;
2. press Set and display the active parameters set, for example. r01 = recipe 1;
3. press UP/DOWN to select the parameters set to be loaded; you can choose between r01…r10; for example r02 (figure);
4. Press Set to confirm. The control system loads the chosen parameters set and displays "bni";
5. Press once or more times Prg to return to standard display..



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "temp recorder" on the second row "bni - recipe index".

Param	Recipes (configurations)									
	Std CAREL	Red meat	Poultry	Fish	Vegetables	Fruit	Summer and tropical fruit	Frozen	Restaurant - fresh food	Bakery
		Heater defrost with probe, evap. fans controlled by temperature and off during defrost	Heater defrost with probe, evap. fans controlled by temperature and off during defrost	Heater defrost with probe, evap. fans controlled by temperature and off during defrost	Heater defrost with probe, evap. fans on with compressor on and on during defrost, humidity control	Timed defrost by stopping compressor, evap. fans on with compressor on and on during defrost, humidity control	No defrost, evap. fans on with compressor on, humidity control	Heater defrost with probe, evap. fans on with compressor on and off during defrost	Heater defrost with probe, evap. fans on with compressor on and on during defrost	Heater defrost with probe, evap. fans controlled by temperature and off during defrost
	r01	r02	r03	r04	r05	r06	r07	r08	r09	r10
/4	0	0	0	0	0	0	0	0	0	0
/t2	12	4	4	4	4	4	11	4	4	4
/A2	0	1	1	1	1	0	0	1	1	1
/A3	0	0	0	0	0	0	0	0	0	0
/A4	0	0	0	0	0	0	0	0	0	0
/A5	0	0	0	0	1	1	1	0	0	0
St	0	-0,5	0	1	4	4	10	-22	3	-20
rd	2	2	2	2	2	2	2	2	2	2
StH	90	90	90	90	95	95	85	90	90	90
rdH	5	5	5	5	5	5	5	5	5	5
r1	-50	-5	-5	-5	0	0	5	-25	0	-25
r2	60	10	10	10	10	10	15	-15	10	-10
r3	0	0	0	0	0	0	1	0	0	0
c11	4	4	4	4	4	4	4	4	4	4
d0	0	0	0	0	0	2	0	0	0	0
dI	8	12	12	12	24	24	8	15	13	15
dt1	4	20	15	10	8	4	4	15	10	15
dP1	30	60	60	60	45	30	30	60	90	60
AL	0	4	4	4	4	5	5	10	4	10
AH	0	5	5	10	5	5	5	6	5	6
Ad	120	60	60	120	60	60	60	60	60	60
A5	0	0	0	0	0	0	0	0	0	0
A9	0	0	0	0	0	0	0	0	0	0
F0	0	1	1	1	0	0	0	0	0	1
F1	5	-8	0	0	5	5	5	5	5	-22
F2	30	30	30	30	15	15	10	30	30	30
F3	1	1	1	1	0	0	0	1	0	1
F4	1	1	1	1	1	1	1	1	1	1
H1	1	0	0	0	0	0	0	0	0	0
H5	1	2	2	2	15	15	15	3	2	3
HO1	0	0	0	0	0	0	0	0	0	0
c12	0	0	0	0	0	0	0	0	0	0
d8d	0	0	0	0	0	0	0	0	0	0
tLi	120	120	120	120	120	120	120	120	120	120
A4	0	0	0	0	0	0	0	0	0	0

Tab. 3.e

For all other parameters not included in this table, the default values will be used for all configurations, as shown in chap.7 Parameter table.

3.3.2 Parameters set to default values

In order to set all parameters sets to the factory values (default):

1. from parameters modification menu, access the category "rcP" and press Set; the message "bni" will appear
2. press UP/DOWN and display the message "bnr";
3. press Set: the message "no" will appear;
4. press UP/DOWN: the message "Std" will appear;
5. press set: the control system brings all parameters sets to default values;
6. press one or more times Prg to return to standard display.

Note: in this manner all the modifications are erased and the original factory values are restored to the default ones, indicated in parameters table.

3.3.3 Defrost

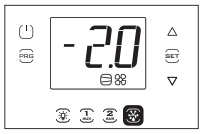
In order to activate the defrost by temperature, the defrost probe must detect a temperature lower than the temperature relative to defrost end (par. dt1). The defrost by time is activated setting dI parameter to a value >0.

Procedure:

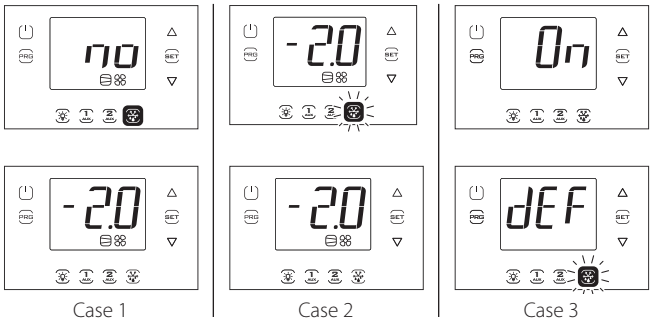
1. press DEF. There can be 3 cases:
2. if the defrost probe detects a temperature greater than the value of the defrost end temperature, the control displays the message "no" and the defrost is not activated;
3. if there are protections in progress, the control waits before entering the defrost. The DEF button blinks and when conditions permit, the control enters the defrost;
4. control comes into defrost, it shows the message "On". The DEF key is lit and the defrost output is enabled. The display depends on parameter d6.

Par.	Description	Def	Min	Max	U.M.
d6	Terminal display during defrost 0 = Temperature alternated with dEF 1 = Last temperature shown before defrost 2 = dEF	1	0	2	-

ACTIVATION MANUAL DEFROST



Request a manual defrost

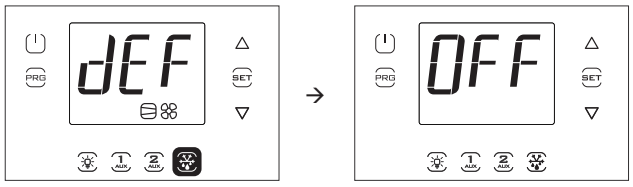


Case 1 Case 2 Case 3

Note: The Figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, the message "no" and "On" appear on the second row of the display.

DEACTIVATION MANUAL DEFROST

Press DEF: message "Off" will appear and the control ends the defrost



Note: The Figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, the message "Off" appears on the second row of the display.

3.3.4 AUX1/AUX2/Light

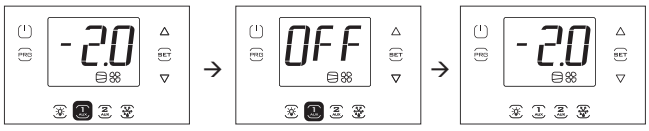
In order to activate/deactivate the digital outputs AUX1/AUX2 from keyboard set the parameters H1/H5=2. The light output is fixed and cannot be configured.

ACTIVATION

Press keys AUX1/AUX2/Light: message "On" will appear and the control activates the relative output.

DEACTIVATION

Press keys AUX1/AUX2/Light: message "Off" will appear and the control deactivates the relative output.



Note: if output AUX1/2 was not enabled by setting H1/H5 = 2, the relative key blinks to signal that the output is not active. However, the messages "On" and "Off" will appear

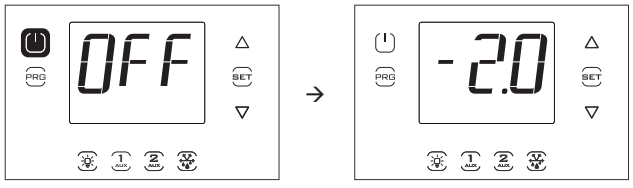
Note: The Figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, the message "On" and "Off" appear on the second row of the display.

3.3.5 On/Off

In order to turn off the control from keyboard:

- press On/Off for 2 s.

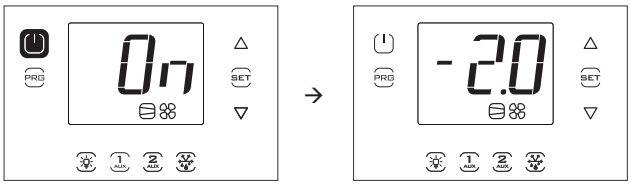
The display will alternate Off to the standard display.
The key On/Off lights up and any active output relay will be deactivated.



Note: The Figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, the message "On" and "Off" appear on the second row of the display.

In order to turn on the control from keyboard:
- press On/Off for 2 s.

"On" will appear on the display and then control returns to the standard display. The output relay will be re-activated.



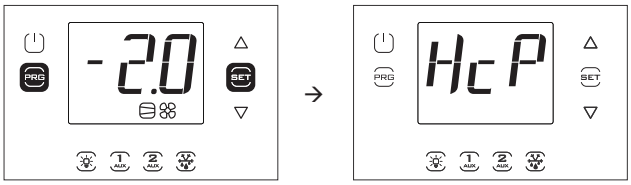
Note: The Figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, the message "On" and "Off" appear on the second row of the display.

3.4 Multifunction menu

The multifunction menu allows you to access:
- "HcP": HACCP alarms display, type HA and HF alarms and reset;
- "cc": continuous cycle activation/deactivation;
- "rEc": display maximum and minimum temperature, cancellation and re-start recording;
- "I/O", input/output: displaying the temperature read by the probe and digital input status;
- "USB": USB key;
- "InF": information
- "Log": datalogging function

Par.	Description	Def	Min	Max	U.M.
cc	Continuous cycle duration	0	0	15	ora

Procedure:
1. press Prg and Set for 2 s; the first menu will appear: HcP;
2. press UP/DOWN to view other entries;
3. press Set to enter: follow the steps described in the following sections for the relative explanations;
4. Press one or more times Prg to return to standard display.



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "Menu" on the second row.

3.4.1 HACCP alarms display

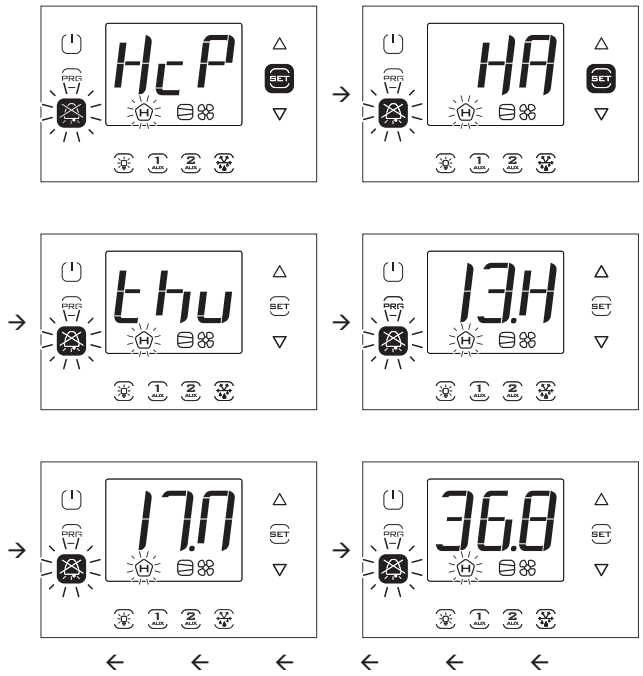
For explanations regarding HACCP alarms, consult chapter "Alarms". In the multifunction menu you can see the date and time of the last 3 alarms HA and HF. After entering the multifunction menu (see previous par.), select with UP / DOWN the message "HcP".

Procedure:
1. press Set, and then UP/DOWN to display the parameters in the following table: you can see the number of alarms, the relative date and you can also cancel the alarms;
2. press Set to display the alarm date and time;
3. press Prg until you return to standard display.

Par.	Description	Def	Min	Max	U.M.
HA	Date/time of last HA alarm	0	-	-	-
HA1	Date/time of penultimate HA alarm	0	-	-	-
HA2	Date/time of third from last HA alarm	0	-	-	-
Han	Number of HA alarms	0	0	15	-
HF	Date/time of last HF alarm	0	-	-	-
HF1	Date/time of penultimate HF alarm	0	-	-	-
HF2	Date/time of third from last HF alarm	0	-	-	-
HFn	Number of HF alarms	0	0	15	-
Hcr	HACCP alarms cancelling Action on variation 0→1 or 1→0	0	0	1	-

Each alarm is displayed with scrolling text, which contains the day of week, hour, minute, and the temperature that caused the alarm. This is a list (FIFO) in which are stored only the last 3 alarms. Instead, the alarm counters (HAn, HFn), after reaching 15, they stop.

Example: HA alarm triggered Thursday at 13:17, with detected temperature of 36.8 °C.



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "HACCP Alarms" on the second row.

3.4.2 Continuous cycle

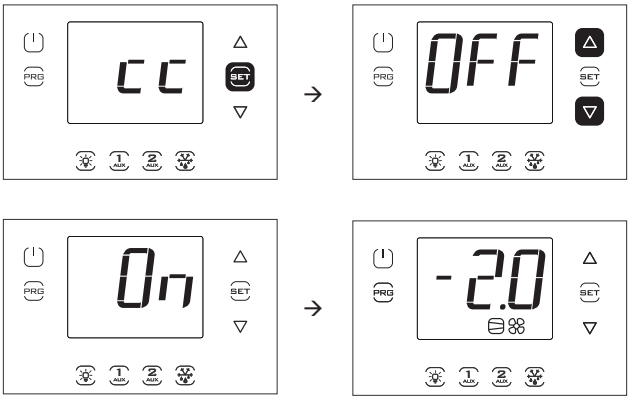
For explanation of continuous cycle, see chapter 6.
In order to activate the continuous cycle
- the control must be on;
- the value of the parameter cc must be >0.

Par.	Description	Def	Min	Max	U.M.
cc	Continuous cycle duration	0	0	15	hour

After entering the multifunction menu (see previous par.), select with UP / DOWN the message "cc".

ACTIVATION

Procedure:
1. press Set; the message "OFF" will appear (continuous cycle disabled);
2. press UP/DOWN: the message "ON" appears;
3. after about 1 s the control returns to standard display and the compressor icon appears, to show the activation of the function.



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "Continuous cycle" on the second row.

DEACTIVATION

Follow the same activation steps and set "OFF".

Note: the activation of the continuous cycle function does not appear on display in standard mode.

3.4.3 Maximum and minimum temperature monitoring

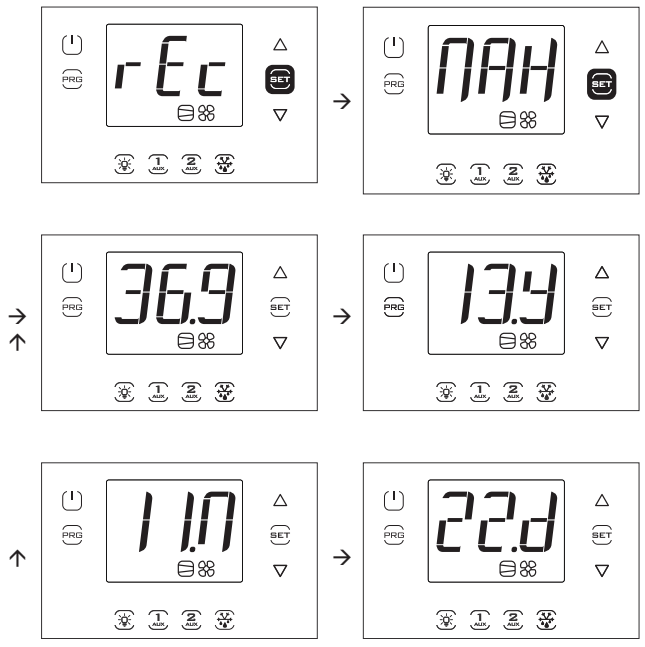
The control allows you to continuously record the minimum and maximum temperature measured by the control probe. The monitoring is always active. The values can be reset, as described below.

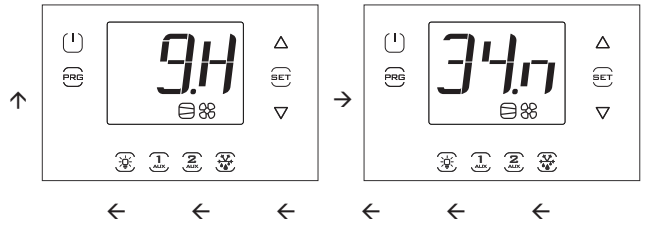
After entering the multifunction menu (see previous par.), select with UP / DOWN the message "rEc".

Procedure:

1. press Set; the message "MAX" will appear (maximum registered temperature); in order to see the maximum temperature, registration date and time pass to point 3 or:
2. press UP/DOWN: the message "MIn" appears (minimum temperature registered);
3. press Set: the maximum/minimum recorded temperature will appear along with the date/time of record (y=year, m = month, d = day, h = hour, m = minutes. Press UP to cancel (both temperatures), appears RES and the control exits the menu, or press Prg for more than once and exit the display.

Example: maximum registered temperature 36.9°C on 22/11/2013 at 9.34.





Note: by pressing UP you will cancel both the maximum and the minimum recorded temperature.

Note: the Figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*:

- MAX --> Max temp recorder (scrolling)
- 36,9 --> Max
- 13.Y --> year
- 11.M --> month
- 22.d --> day
- 9.H --> hour
- 34.m --> minute

3.4.4 Input/output status display

After entering the multifunction menu (see previous par.), select with UP / DOWN the message "I/O".

Procedure:

1. Press Set: the message "b1" appears regarding the probe B1;
2. Press Set once again: the value read on probe B1 will appear alternating with the message b1;
3. Press Prg to return to upper level;
4. Press UP/DOWN and repeat steps 1)…3) to display the inputs/outputs indicated in table;
5. Press one or more times Prg to return to standard display

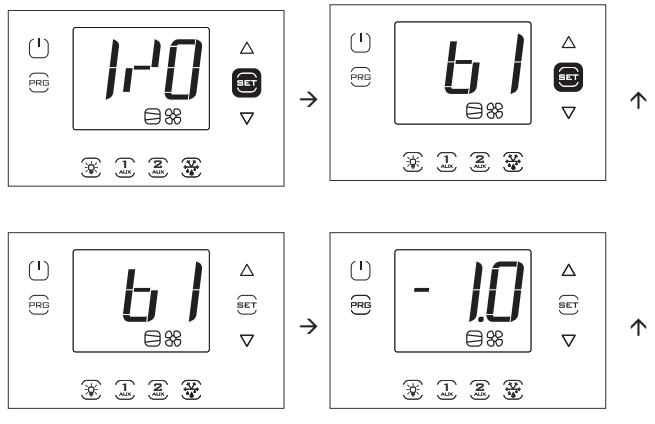
Text	Description
b1	Analogue input 1
b2	Analogue input 2
b3	Analogue input 3
b4	Analogue input 4
b5	Analogue input 5
di1	Digital input 1
di2	Digital input 1
di3	Digital input 1
do1	Digital output 1

Text	Description
do2	Digital output 2
do3	Digital output 3
do4	Digital output 4
do5	Digital output 5
do6	Digital output 6
Y1	Analog output 1
ESu	EVD suction temp.
ESA	EVD evaporation temp.

Tab. 3.f

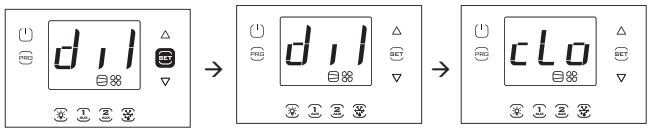
Note: the opened digital inputs/outputs are displayed along with the message "oP" (=open), those closed with "cLo" (=closed).

Example 1: probe B1 measures the temperature of -1.0 °C..



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "Probe1 status" on the second row ".

Example 2: digital input 1 is closed.



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "Digital input 1 status" on the second row.

3.4.5 USB memory key

Preliminary operations:
1. remove the lower frame and insert the USB memory key;
2. set the control to OFF.

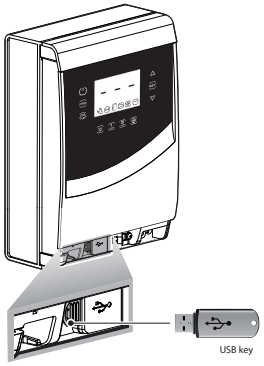


Fig. 3.d

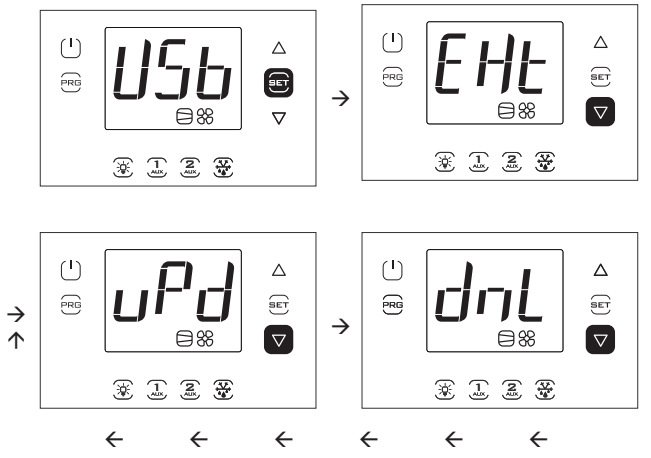
After entering the multifunction menu (see previous par.), select with UP / DOWN the message "USb".

Procedure:

Press Set: the following commands will appear by scrolling UP/DOWN:
- EXt: press Set to exit;
- dnL: press Set, the control saves inside the key the 10 parameters set: r01…r10;
- uPd: press Set, the control loads from the key the 10 parameters set: r01…r10;

Note

- the parameters are saved in a text file type. txt, which can be viewed on the computer;
- for information regarding the switching of the LEDs, see chapter 2.10..



Note: the figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "USB device" on the second row

3.4.6 Information

In the information menu you can view the software release.

After entering the multifunction menu (see chapter 3.4), select with UP / DOWN the message "InF".

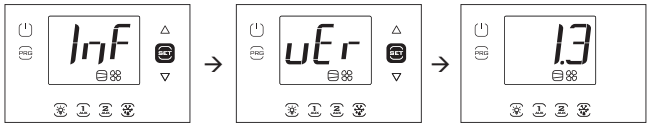


Fig. 3.e

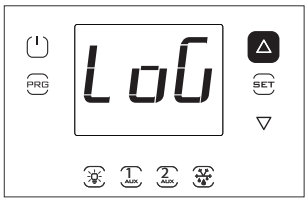
Procedure:
1. press Set: the message "vEr" appears regarding the software revision;
2. press Set once again: the software revision will appear (e.g. 1.3);
3. press one or more times Prg to return to standard display .

Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "Application version" on the second row

3.4.7 Data logging function

UltraCella introduces the data logging function to cold room control, offering the possibility to record the temperature read by probe B4.

How to download the file with temperatures recorded by UltraCella:
1. remove the bottom frame and insert the USB flash drive. The red and green LEDs next to the flash drive will come on once in sequence to indicate the that unit has recognised the USB flash drive;
2. press Prg and Set for 2 s; the first menu will be displayed: "HcP"
3. press UP or DOWN until reaching the "LoG" menu item;
4. press SET to confirm the download of the recorded temperatures (log file) to the USB flash drive. The message "LoG" will flash during downloading; at the end, "LoG" will stop flashing to indicate that the download has been completed; if the procedure fails for some reason, the alarm icon will be shown on the display;
5. remove the flash drive; to exit the "LoG" menu, press PRG and/or SET.



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "temp recorder" on the second row.

Note: if the procedure fails for some reason, when exiting the menu, as well as the alarm icon the error message "LoG" will also be shown on the display.
The message error will be cleared after the next correct download or when restarting the controller

When probe B4 is suitably configured, the unit starts recording the temperature read by the probe every 5 minutes (sample time) for a maximum period of 4 years. After the fourth year, the controller overwrites the oldest data saved.
The temperature log is available as a csv file via USB flash drive, which can be analysed in Excel or other widely-available programs.

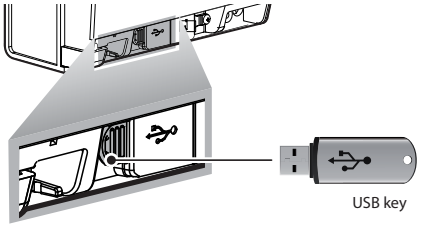


Fig. 3.f

UltraCella can only record the temperature read by probe B4.

To activate the data logging function, probe B4 must be configured as the temperature recording probe, setting /A4=3 (analogue input B4 must be configured as a temperature probe: /P4=0 or 1)

Par.	Description	Def	Min	Max	U.M.
/A4	B4 configuration … 3 = Record probe (Src)	0	0	3	-

- Channel recorded: only analogue input B4
- Start logging: as soon as parameter /A4 is set to 3. The instant the setting is confirmed is recorded in the log under event name "Start"
- Sample time: 5 minutes (not modifiable by the user)
- Logging period: 4 years from recording the first sample (determined by the event /A4=3). After this period, the controller overwrites the oldest samples saved
- Data extraction: any USB flash drive available on the market can be used
- Extracted log file name: Log_UltraCella.csv
- Other events: as well as the "Start" event, the log also records "Stop" events (probe /A4 no longer configured as recording probe "Src") and "Boot" (starting or restarting the controller)
- Log data format: the data is organised in columns: date (yy/mm/dd hh:mm:ss), type of event, temperature (in °C or °F in relation to parameter /5t)

Example: recording started on 2 April 2014 at 17:19:49. The data were extracted by USB flash drive at 18:10 on the same day.

TIME	EVENT	Src_Probe (°C)
2014/04/02 17:19:49	Boot	0
2014/04/02 17:24:49		25,2
2014/04/02 17:29:49		25,0
2014/04/02 17:34:49		24,6
2014/04/02 17:39:49		24,1
2014/04/02 17:44:49		21,9
2014/04/02 17:49:49		18,8
2014/04/02 17:54:49		15,1
2014/04/02 17:59:49		12,7
2014/04/02 18:04:49		10,1
2014/04/02 18:09:49		7,3

Tab. 3.g

4. COMMISSIONING

4.1 First commissioning

After wiring the electrical connections and the power supply (see installation chapter), the operations required for commissioning the UltraCella control system depend on the type of interface used. Refer to some parameters such as:

1. Set-point and differential;
2. Probes and digital inputs configuration;
3. Selection of the type of defrost and fans operation;
4. Cold room light management.

Types of interfaces:

- board with LED display: parameters configuration is performed using the display and the keyboard based on the procedure described in chap.3 "parameters change". Alternatively, you can connect the remote graphic terminal "UltraCella Sevice Terminal" and enter the wizard menu for first commissioning (wizard);
- USB memory key: put the control on OFF and load the programming parameters from USB memory key (uPd command, UPLOAD, see Chapter 3);
- supervisor: in order to facilitate the launch of a large number of controls UltraCella using only the supervisor you can limit the operation of the first commissioning to the serial address setting. The configuration is postponed to a later time using the supervisor.

After the configuration you can enable the control of the cold room by pressing the ON/OFF key.

4.2 Parameters to be set for the commissioning

Par	Description	Categ.	Def	Min	Max	U.M.
St	Set point	CtL	0	r1	r2	°C/°F
rd	Differential	CtL	2.0	0.1	20	°C/°F
/P	Type B1 to B3	Pro	0	0	2	-
/A2	B2 configuration	Pro	0	0	2	-
/A3	B3 configuration	Pro	0	0	3	-
/P4	Type B4	Pro	0	0	2	-
/A4	B4 configuration	Pro	0	0	3	-
/P5	Type B5	Pro	0	0	0	-
/A5	B5 configuration	Pro	0	0	1	-
A5	Digital input configuration 2 (DI2)	ALM	0	0	14	-
A9	Digital input configuration 3 (DI3)	ALM	0	0	14	-
d0	Type of defrost	dEF	0	0	3	
dt1	End defrost temperature, main evaporator	dEF	4.0	-50.0	200.0	°C/°F
dt2	End defrost temperature, auxiliary evaporator	dEF	4.0	-50.0	200.0	°C/°F
dP1	Maximum defrost duration	dEF	30	1	250	min
dd	Dripping time after defrost (fans off)	dEF	2	0	30	min
Fd	Post dripping time (fans off)	Fan	1	0	30	min
F3	Evaporator fan during defrost 0/1=on/off	Fan	1	0	1	-
C12	Compressor safety for door switch 0 = disable door management	doL	0	0	5	min
d8d	Compressor restart time for door switch	doL	0	0	240	min
tLi	Light on with door open	doL	120	0	240	min
A4	Light management 0 = door switch + light key 1 = light key	doL	0	0	1	-
c1	Minimum time between compressor starts	CmP	6	0	15	min
c2	Minimum compressor off time	CmP	3	0	15	min
c3	Minimum compressor on time	CmP	3	0	15	min

Tab. 4.a

4.3 Single digit display models cod. WB000S* commissioning

UltraCella with single row display

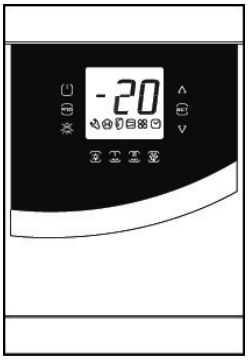
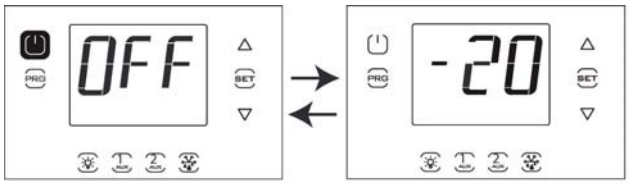
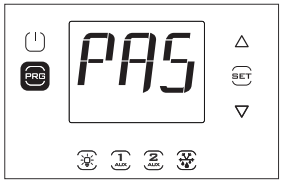


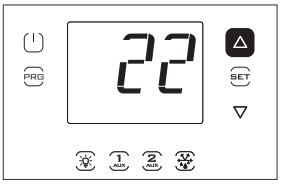
Fig. 4.a



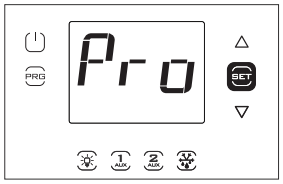
1. First switch the controller OFF (press ON/OFF).



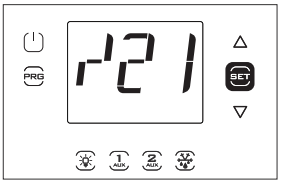
2. Press Prg for 2 sec: the password prompt is displayed (PAS).



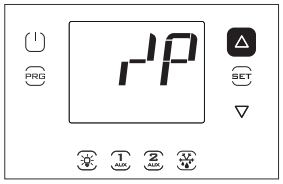
3. Press UP and enter the password: 22.



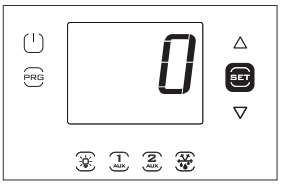
4. Press Set: the first category is displayed: Pro (Probes).



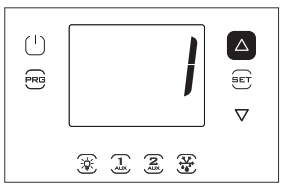
5. Press Set: the first parameter is displayed: /21.



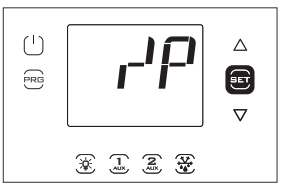
6. Press repeatedly UP to reach the parameter /P.



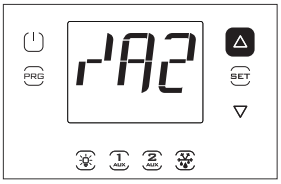
7. Press Set to set the value of the parameter (see settings in the parameter table).



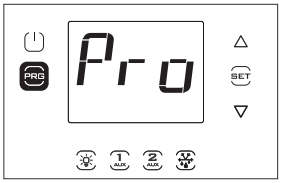
8. Press UP to modify the value.



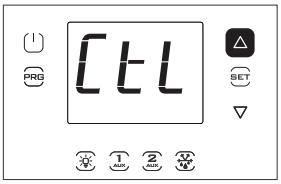
9. Press Set to confirm and return to the parameter code. The new value has now been saved on the controller.



10. Press UP to move to parameters /A2.../ A5; make any required settings.



11. Press Prg to return to the parameter categories.

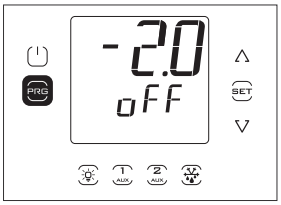


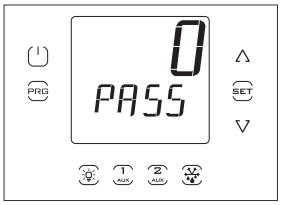
12. Press UP to move to category CtL and follow the previous steps to set St and the following parameters.

4.4 Double digit display models cod. WB000D* commissioning

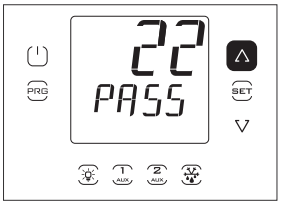
UltraCella with double row display

Fig. 4.b

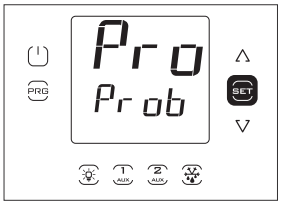




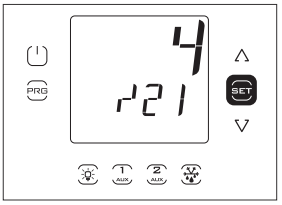
1. First switch the controller OFF (press ON/OFF).
2. Press Prg for 2 sec: the second row of the display will show "PASS" (password required).



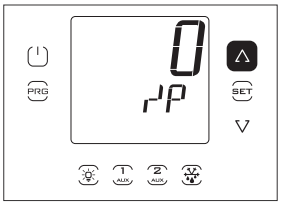
3. Press UP/DOWN to enter the password: 22.



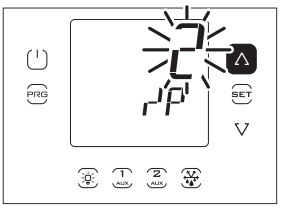
4. Press Set; the second row of the display will scroll the name of the first category of parameters: Probes.



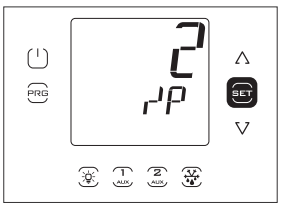
5. Press Set: the second row of the display will scroll the code and description of the first parameter in the category: /21 – Probe1 meas. stab.; the first row of the display will show the current value of the parameter



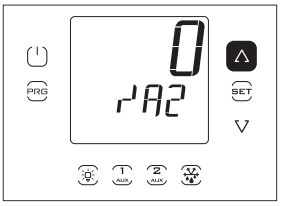
6. Press UP repeatedly until reaching parameter /P. The second row of the display will scroll the code and description of the parameter: /P – type B1 to B3; the first row of the display will show the current value of the parameter



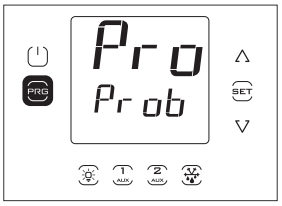
7. Press Set and UP/DOWN to set the desired value of the parameter.



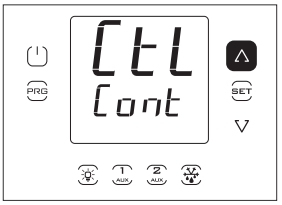
8. Press Set to confirm. The new value entered is now saved on the controller.



9. Press UP to move to parameters /A2…/A5; make any required settings .



10. Press Prg to return to the categories of parameters.



11. Press UP to move to category CtL (the second row scrolls the name of the second category of parameters: Control) and follow the previous steps to set St and the subsequent parameters, as shown in the previous table and in the parameter table.

4.5 Commissioning with UltraCella Service Terminal

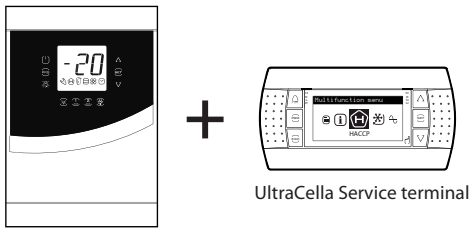


Fig. 4.c

If the UltraCella controller has never been configured, as soon as the terminal is connected, the wizard is shown automatically. The Wizard menu can also be accessed to repeat the guided commissioning procedure before the first commissioning.

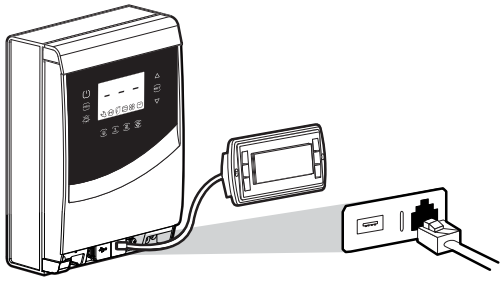


Fig. 4.d

Remove the bottom faceplate and connect the UltraCella Service Terminal to the controller.

4.5.1 First start - up

When starting for the first time, once the Service Tool is connected, the wizard is shown automatically. Set "Yes" to change the set point and then answer the questions to set the other parameters.

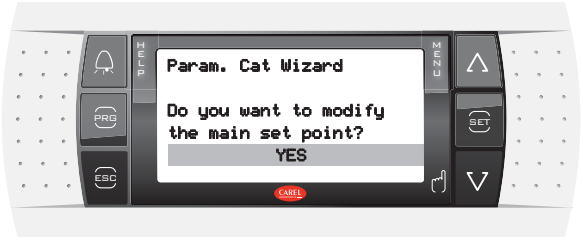


Fig. 4.e

4.5.2 Repeated commissioning procedure

The commissioning procedure can be repeated by accessing the Wizard menu.

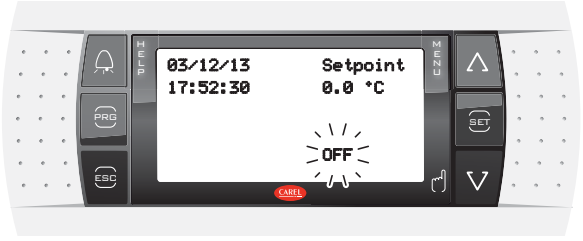


Fig. 4.f

1.Switch the controller OFF (press DOWN and select the On/Off icon; press Set twice and then UP to switch the controller OFF; press Esc twice to exit)

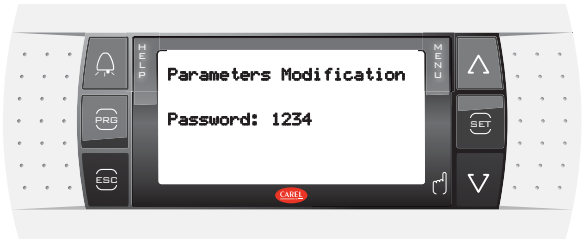


Fig. 4.g

2. To enter programming mode: Press Prg and enter the password: 1234

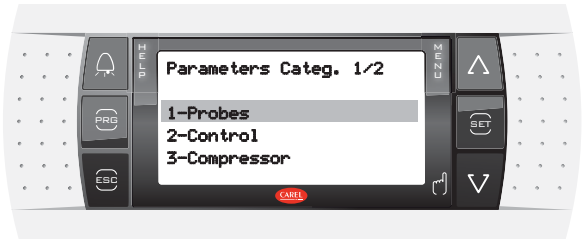


Fig. 4.h

3. Press DOWN until reaching the "Wizard" menu

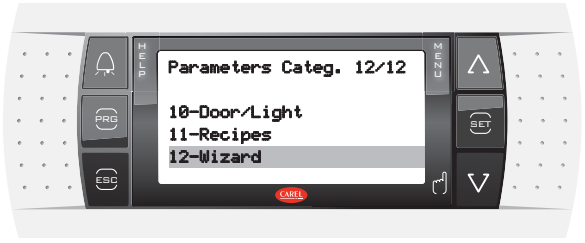


Fig. 4.i

4. Confirm by selecting Set.

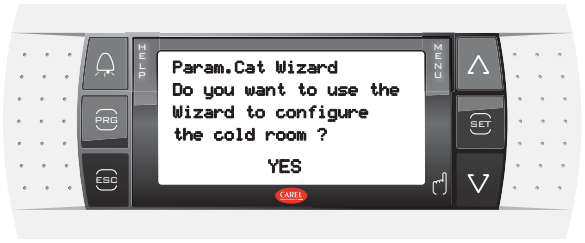


Fig. 4.j

5. Press Up and SET to enter the guided commissioning procedure.

4.6 Main function commissioning

4.6.1 Set-point and differential

The reference output is the compressor output (CMP). The set point and differential determine the compressor activation and deactivation temperatures. The control probe is the virtual probe Sv. At start-up it corresponds to probe B1. If the temperature inside the cold room is not uniform the control can be set (by placing /4> 0) to regulate on a "virtual" probe obtained from the average of two measurement points (probes B1 and B2).

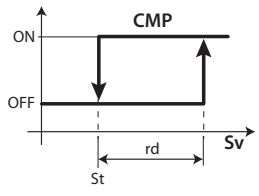


Fig. 4.k

Key

St	Set point
Sv	Virtual probe
rd	Differential
CMP	Compressor

4.6.2 Probes configuration

The UltraCella controls have a maximum of 5 analog inputs, of which 3 can be configured as temperature probes (NTC probes, NTC high temperature probes, PT1000), the fourth as temperature probe or input 0 ... 10 V, the fifth can be configured as input 4 ... 20 mA.

Analogue Inputs	Type
B1	NTC10 kΩ a 25°C, range -50T90°C,
B2	NTC extended range, NTC50 kΩ a 25°C, range 0T150°C;
B3	PT1000, 1000 Ω a 0°C, range -50T90°C
B4	NTC10 kΩ a 25°C, range -50T90°C, NTC extended range, NTC50 kΩ a 25°C, range 0T150°C 0…10 V
B5	4…20 mA

Tab. 4.b

Below the parameters with the selection:

Par.	Description	Def	Min	Max	U.M.
/P	Type B1 to B3 0 = NTC Standard Range -50T90°C 1 = NTC Enhanced Range 0T150°C 2 = PT1000	0	0	2	-
/P4	Type B4 0 = NTC Standard Range -50T90°C 1 = NTC Enhanced Range 0T150°C 2 = 0 to 10 V	0	0	2	-
/P5	Type B5 0 = 4 to 20 mA	0	0	0	-

4.6.3 Probes function assignment B1, B2, B3, B4, B5

The control, inside the cold room, can use the probes:

- outlet;
- intake;
- defrost, placed in the evaporator, preferably where the ice resides most;
- condenser, used to protect the compressor due to high discharge temperature, associated with fowling of the condenser or fan failure.

Probe B1 is configured as environment probe and its function cannot be changed.

Par.	Description	Def	Min	Max	U.M.
/A2	Configuration B2 0 Absent | 2 Intake probe 1 Defrost probe 1	0	0	2	-
/A3	Configuration B3 0 Absent | 2 Cond.probe 1 Defrost probe 2 | 3 Defr. probe 1	0	0	3	-
/A4	Configuration B4 0 Absent 1 Ambient temperature probe (SA) 2 Humidity probe 3 Recording probe (Src)	0	0	3	-
/A5	Configuration B5 0 Absent 1 Humidity probe	0	0	1	-

4.6.4 Probes reading correction

The values read by the probes can be corrected by adding/removing an offset from the measure with the parameters /c1, ..., /c5.

Par.	Description	Def	Min	Max	U.M.
/c1	Offset B1	0	-20.0	20.0	-
/c2	Offset B2	0	-20.0	20.0	-
/c3	Offset B3	0	-20.0	20.0	-
/c4	Offset B4	0	-20.0	20.0	-
/c5	Offset B5	0	-20.0	20.0	-

Offsets may be required to meet the calibration requirements of HACCP systems. In this case, the offset should be obtained using calibrated instruments and proper records should be kept. The modification of these parameters, influencing the measurement and display, may not be allowed in some applications. If in doubt, consult the person in charge of food safety.

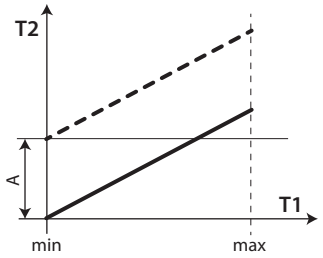


Fig. 4.l

Key

T1	Temperature measured by the probe
T2	Temperature measured by the probe after offset correction
A	Offset value
min, max	Measurement range

HACCP - CAUTION

The modification of these parameters, influencing the measurement and display, may not be allowed in some applications or might require special approval because it may affect the operation of HACCP systems.
If in doubt, consult the person in charge of food safety or the manager of the plant.

4.6.5 Digital inputs

Note: the digital input 1 (DI1) is suited for door switch and is not programmable.
If door switch is not used, short-circuit pin 21 (DI1) with a GND pin.

You can link multiple contacts to multifunction digital inputs to activate various functions, such as alarm, enable / start defrost, low pressure, etc..

Caution: in order to ensure the safety of the unit in the event of serious alarms, all the electromechanical safety devices required to guarantee correct operation must be fitted on the unit.

Operation of the digital inputs

PARAMETERS A5, A9

Selection	Contacts	
	OPEN	CLOSE
0 = Not active	-	-
1 = Immediate external alarm	active	not active
2 = Do not select	-	-
3 = Enable defrost	not enabled	enabled
4 = Start defrost	not active	active
5 = Do not select	-	-
6= Remote On/Off	OFF	ON
7 = Do not select	-	-
8 = Low pressure switch	low pressure status	normal status
9 = Do not select	-	-
10 = Do not select	-	-
11 = Do not select	-	-
12 = AUX activation	deactivated	activated
13 = Do not select	-	-
14 = Continuous cycle activation	contact opening (deactivation)	contact closing (activation)

Tab. 4.c

Below are indicated the parameters used to explain the selections for A5 and A9.

1 = Immediate external alarm

Application: external alarm that requires immediate activation (for example, high pressure alarm or compressor thermal overload). The activation of the alarm:

1. • shows the message on the display (IA);
   • activates the buzzer, if enabled;
   • activates the alarm relay, if selected;
2. involves the following actions on the actuators:
   • compressor: operates depending on the values assigned to parameter A6 (stop compressor on external alarm).
   • fans: continue to operate according to the fan parameters (F).

Note:

- when stopping the compressor, the minimum ON time (c3) is ignored.
- if more than 1 input is configured on immediate alarm, the alarm is generated when one of the inputs is opened.

2 = Do not select

3 = Enable defrost

Application: Any defrost request arriving when the contact is open will remain pending until the contact closes.

A5/ A9 = 3

Contacts	Defrost
Open	Not enabled
Closed	Enabled (defrost start is still determined by the control)
Close with active defrost	when the digital input is opened, the defrost is immediately stopped and the unit restarts normal operation (without performing the dripping or post-dripping phases). The LED starts flashing to indicate that the defrost request is pending, waiting for the next enabling signal (closing of the contact), when the defrost will be performed completely.

Tab. 4.d

Note: this function is useful to prevent defrosts on the units accessible by the public during opening times.

4 = Start defrost from external contact

Application: this feature is useful in case you need to perform synchronized defrost across multiple units or otherwise manually controlled by an external contact. To perform the defrosts, connect a cyclical, mechanical or electronic timer to the digital input. You can connect multiple units at the same timer and set different values for the parameter d5 (defrost delay from multifunction input) to avoid simultaneous defrosts.

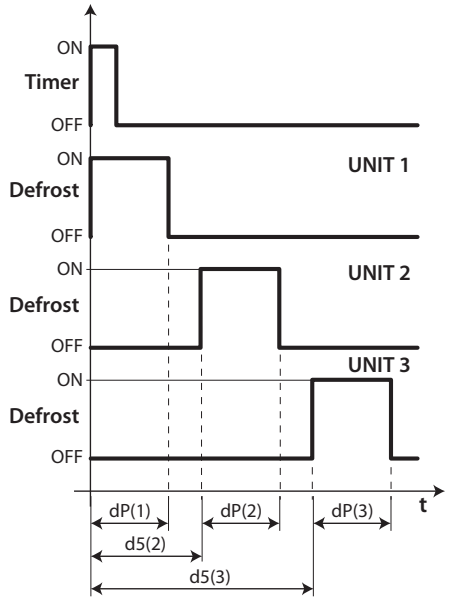


Fig. 4.m

Key

dP	Maximum defrost duration
UNIT 1…3	Unit 1…3
d5	Defrost delay form digital input
t	Time

5 = Do not select

6=On/Off remote

The digital input can also be programmed as a remote ON/OFF switch. When the control is set to OFF:

- the temperature is displayed alternately with the message "OFF", the internal timer relative to the parameter "dI" is updated. If dI expires when the unit is OFF, a defrost is performed when the unit is switched on again;
- the auxiliary relays remain active set as an auxiliary output and light, the other auxiliary outputs are off;
- the buzzer and the alarm relay are off;
- the control does not perform the control functions, defrosts, continuous cycle, temperature alarm signalling and all the other functions;
- the compressor protection times are respected.

At control restart, all functions are reactivated, except:

- defrost at start-up;
- compressor and fan delay at start-up.

Note: The ON/OFF from external digital input has priority over the keypad and the supervisor.

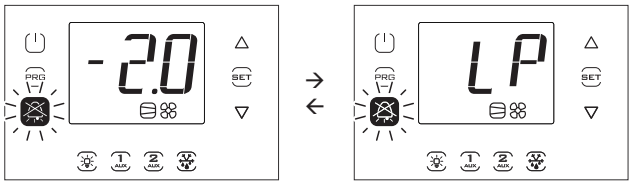
7 = Do not select

8 = Low pressure switch

By setting "A5/A9"=8 you can manage the low pressure switch. The low pressure alarm "LP" is signalled when the low pressure switch is triggered:

- during normal regulation, with active compressor and pump down function is disabled (c7=0)
- with pump-down function enabled (c7 >0), if the pump down valve is opened and the compressor is active.

The low pressure alarm signal is delayed by the time set for parameter A7. The low pressure alarm 'LP' stops the compressor.



9, 10, 11 = Do not select

12 = Auxiliary output

Setting H1/H5 = 2 the corresponding output AUX1/ AUX2 is activated by the key AUX1/ AUX2. Besides, it is possible to use alternatively one digital input DI2 or DI3 (set A5 or A9=12) to drive output AUX2 or AUX3. In this case the key and the digital input have the same priority as regards the switch on.

13 = Do not select

14 = Continuous cycle activation

Activation: passage of the contact from opened to closed;
Deactivation: passage of the contact from closed to opened.

4.6.6 Type of defrost

UltraCella allows you to manage the following types of defrost, depending on parameter d0:

0. electric heater defrost by temperature;
1. hot gas defrost by temperature;
2. electric heater defrost by time;
3 hot gas defrost by time.

For further explanations please see chap. 6.

Par.	Description	Def	Min	Max	U.M.
d0	Type of defrost 0 heater by temperature. 1 hot gas by temperature 2 heater by time 3 hot gas by time	0	0	3	-
dt1	End of defrost temperature, main evaporator	4.0	-50.0	200.0	°C/°F
dP1	Maximum defrost duration	30	1	250	min

4.6.7 Evaporator Fans

During the dripping periods (parameter dd > 0) and post-dripping periods (parameter Fd > 0) the evaporator fans are always off. This is useful to allow the evaporator to return to normal temperature after defrost. There is the possibility to force the start of the evaporator fans during control (parameter F2) and during defrost (parameter F3). See chap. 6

Par.	Description	Def	Min	Max	U.M.
dd	Dripping time after defrost (fans off)	2	0	30	min
F2	Fan activation time with compressor OFF	30	0	60	-
F3	Evaporator fan during defrost 0/1=on/off	1	0	1	-
Fd	Post dripping time (fans off)	1	0	30	min

4.6.8 Door opening

If the door is left open, the signalling control is made via the door switch (digital input 1, already configured). When the door is open, the evaporator fans are turned off if set as fixed speed fans (F0=0, 1), otherwise operate at minimum speed defined by parameter F7 (if F7<50) if set as variable speed fans (F0= 2); the compressor continues to operate for the time c12, then turns off. Once passed the period of time d8d from door opening, compressor and evaporator fans are running again and the error "dor" is displayed.

Par.	Description	Def	Min	Max	U.M.
c12	Compressor safety time, door switch 0 = disabled door management	0	0	5	min
d8d	Compressor restart time for door switch	0	0	240	min

Special cases refer figure 4.n and 4.o:

- to disable door alarm, set d8d =0. If d8d = 0, c12 is also considered =0;
- to keep only phase 2 (figure), in which the compressor is on, and to eliminate phase 3 in which the compressor/ evaporator fan is off, set d8d=c12;
- to keep only phase 3 (figure), c12=0;
- during phase 3 the compressor may be on if:
  1. pump down is activated;
  2. hot gas defrost is activated.

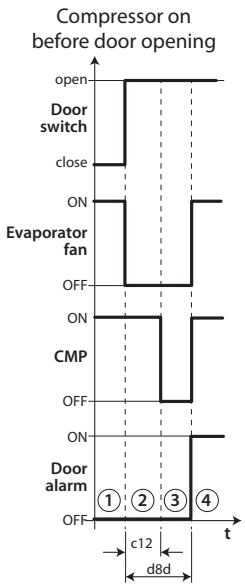


Fig. 4.n

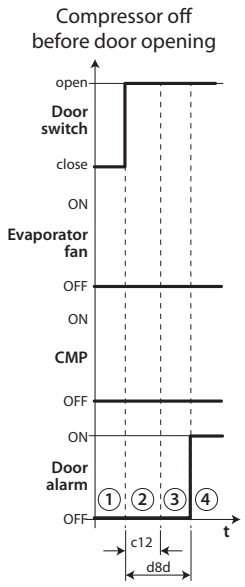


Fig. 4.o

Key

t	Time
Door_sw	door switch
Evap_fan	Evaporator fan
CMP	Compressor
Dor alarm	Door alarm "dor"

Note: to render the time settings operational, the control must restart. Otherwise, the settings will be used only at the next use, when the inner timers are set.

4.6.9 Compressor management

- c1 determines the minimum time between two consecutive starts of the compressor;
- c2 sets the minimum turn off time for the compressor.
- c3 sets the minimum running time for the compressor.

Par.	Description	Def	Min	Max	U.M.
c1	Minimum time between two successive starts of the compressor	6	0	15	min
c2	Compressor minimum switch-off time	3	0	15	min
c3	Compressor minimum switch-on time	3	0	15	min

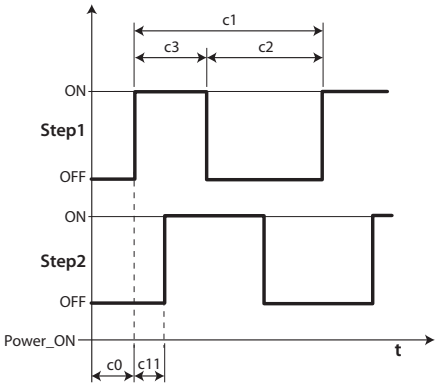


Fig. 4.p

Note: c2 parameter used to ensure the balance of the pressure after the compressor stop and to avoid blocking at the next reboot of those compressors that do not have sufficient starting torque.

4.7 Light management

The light can be managed:
- from door switch and/or light key;
- only from light key.

Below are indicated the involved parameters.

Par.	Description	Def	Min	Max	U.M.
tLi	Light on with door open	120	0	240	
A4	Light management 0 Door switch + light key 1 Light key	0	0	1	-

Note: if the control is OFF, the light output is controlled only by the light key. If the control is set to ON, the light is controlled by a door switch + light key or just light key according to the setting of the parameter A4.

4.7.1 Door switch + light key

If A4=1 the light is on/off only using the light key. The open/closed status of the door is ignored. If A4=0, when the cold room door is opened, the light is always on. When the door is closed, the light can be turned on or off using the light key. Once turned on, the light will automatically turn off after the time set in parameter tLi.

LIGHT CONTROL FROM DOOR SWITCH AND LIGHT KEY

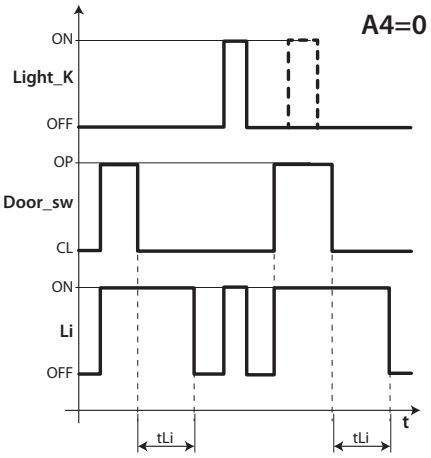


Fig. 4.q

Key

Light_k	Light key
Li	Light
Door_sw	Door switch
tLi	Light turn off delay
t	Time

4.8 Other configuration parameters

The configuration parameters must be set during the commissioning of the controller and concern:
- date/time set;
- measurement stability of the analogue probes;
- display of the decimal point on control;
- serial address for monitoring network connection;
- temperature measurement unit (°C / °F);
- disabling of keyboard, keys and buzzer;
- display view during defrost.

Date/ time set

See example 2 in chap.3.

Analogue probes measuring stability

It defines the filter coefficient used to stabilize the temperature measurement. Low values assigned to this parameter allow a prompt response of the sensor to temperature variations, but the reading becomes more sensitive to disturbance. High values slow down the response, but guarantee greater immunity to disturbance, that is, a more stable and more precise reading.

Par.	Description	Def	Min	Max	U.M.
/21	Stability measuring probe 1	4	0	9	-
/22	Stability measuring probe 2	4	0	9	-
/23	Stability measuring probe 3	4	0	9	-
/24	Stability measuring probe 4	4	0	9	-
/25	Stability measuring probe 5	4	0	9	-

Display view

On models with single row display, P/Ns WB000S*, it is possible to show a single characteristic, selectable through /t1 parameter.
On models with two rows, P/Ns WB000D*, and on the UltraCella Service terminal, it is possible to show two different characteristics, the first selectable through /t1 parameter, and the second through /t2 parameter.

Par.	Description	Def	Min	Max	U.M.
/t1	Display variable 1 0 None, 1 Virtual probe, 2 Outlet probe, 3 Intake probe, 4 Defrost probe 1, 5 Defrost probe 2, 6 Set point, 7 B1, 8 B2, 9 B3, 10 B4, 11 B5	1	0	11	-
/t2	Display variable 2 0 None, 1 Virtual probe, 2 Outlet probe, 3 Intake probe, 4 Defrost probe 1, 5 Defrost probe 2, 6 Set point, 7 B1, 8 B2, 9 B3, 10 B4, 11 B5, 12 rd, 13 superheat, 14 valve opening %, 15 valve opening step	6	0	15	-

Serial address (parameter H0)

H0 assigns an address to check for serial connection to a supervision system and / or remote assistance.

Par.	Description	Def	Min	Max	U.M.
H0	Serial Address	193	0	207	-

Temperature unit of measure and decimal point display

The control allows:

- choosing the temperature measuring unit between Celsius (°C) and Fahrenheit (° F) degrees;
- to enable/disable the display of the decimal point and buzzer.

Par.	Description	Def	Min	Max	U.M.
/5t	Temperature unit of measure 0/1 = °C for temperature and Bar for pressure sensors / °F for temperature and psi for pressure sensors of EVD (if present)	0	0	1	-
/6	Display decimal point 0/1 = yes/no	0	0	1	-
H4	Buzzer 0/1 = enabled/disabled	0	0	1	-

Disable keypad

You can inhibit some functions relating to the use of the keypad, for example, the modification of the parameters and the set point if the unit is accessible to the public

Par.	Description	Def	Min	Max	U.M.
H6	Terminal keys block configuration 0 = all keys enabled.	0	0	255	-

Configuration table

FUNCTION	par. H6
Set-point modification	1
Defrost	2
-	4
AUX1output	8
Multifunction menu (HACCP)	16
AUX2 output	32
On/Off management	64
Light management	128

Tab. 4.e

Example: to disable the activation functions of the outputs AUX1 and AUX2, set H6 = 8+32 = 40.

4.9 Ultra EVD module commissioning

If Ultra EVD Module is connected to UltraCella as shown in figure 2.o (on FieldBus RS485 Modbus protocol), it's possible to make the commissioning of the Module through UltraCella, using both built-in display and/or UltraCella Service if available.
Since the driver inside Ultra EVD Module is a standard EVD Evo driver, please see the relevant manual for details (code +0300005EN).
The EVD parameters that can be set using UltraCella are listed in chapter 7, EVD parameters category, while EVD alarm are listed in chapter 8.5 of this manual.

5. OUTPUTS CONFIGURATION AND PROTECTIONS

5.1 Analogue output

It is available analog output Y1, to drive the evaporator fans designed to be operated with input 0 ... 10 V. See the chapter 6.9.

Par.	Description	Def	Min	Max	U.M.
HO1	Configuration output Y1 0 Not active 1 Do not select 2 Variable speed evaporator fans set on Sd probe	0	0	2	-

5.2 Digital Outputs

Note: for the other protection parameters (c1, c2, c3) see chapter 4.

5.2.1 Delay start for compressor output

Par.	Description	Def	Min	Max	U.M.
c0	Compressor/ fan start delay at power on	0	0	15	min

- c0: from the moment in which the control is powered-up, turning on the compressor and the evaporator fan is delayed by a time (in minutes) equal to the value assigned to this parameter. This delay helps to protect the compressor against repeated starts in the case of frequent power failures.

5.2.2 Safety devices for outputs with different relays

Par.	Description	Def	Min	Max	U.M.
c11	Second compressor start delay	4	0	250	s

- c11 sets the activation delay between the first and the second compressor (or between the first and the second step of the compressor).

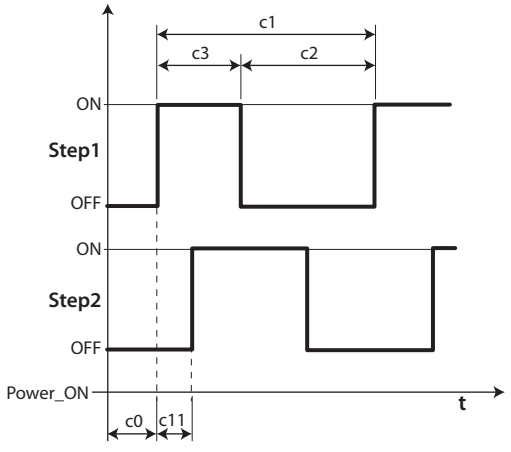


Fig. 5.a

Key

Step1	Step 1 compressor
Step2	Step 2 compressor
t	Time

5.2.3 Output operation AUX1/AUX2

The AUX1 and AUX2 outputs can be associated with different functions, such as alarm, auxiliary output controlled by AUX button, the pump down valve, condenser fan, compressor, second compressor with rotation. For further explanations, please consult chapter 3.2.

Par.	Description	Def	Min	Max	U.M.
H1	Configuration of output AUX1 0 = Normally energized alarm 1 = Normally deenergized alarm 2 = Activation by AUX1 key 3 = Bowl resistance activation 4 = Auxiliary evaporator defrost 5 = Pump down valve 6 = Condenser fan 7 = Delayed compressor 8 = Do not select 9 = Do not select 10 = Do not select 11 = Do not select 12 = Do not select 13 = Second compressor step 14 = Second compressor step with rotation 15 = humidity output	1	0	15	-
H5	Configuration of output AUX2 See H1	1	0	15	-

6. CONTROL

6.1 Switching the controller ON and OFF

The state of ON/OFF can be controlled by more than one source, keyboard, digital input and supervisor. When the controller is off, the display will show the temperature selected for parameter /t1 alternating with the OFF message. The digital input can be used to switch the controller on/off, setting parameter A5/A9 to "6". The activation state of ON / OFF from digital input has priority over the one from the supervisor and keyboard.

Origin	Priority	Notes
Digital input	1	Disable On/Off from keypad and supervisor
Keyboard	2	
Supervisor	2	

Tab. 6.a

6.2 Virtual probe

The control output of the controller is the compressor output. The control probe is the ambient probe B1 (default setting), while the probes B2, B3, B4, B5 may be associated with the functions of defrost probe 1/2, outlet probe, intake probe, condenser probe. If the cold room is very large you should also use a second probe to control the temperature of the room. The controller will activate the compressor based on the requirements of the virtual probe (Sv), obtained from weighed average of the 2 probes (B1, B2).

Par.	Description	Def	Min	Max	U.M.
/4	Virtual probe composition 0 = probe B1 100 = probe B2	0	0	100	-

The /4 parameter is used to determine the virtual probe (Sv) as a weighted average of the control sensor probe B1 and B2, according to the formula:

$$Sv = \frac{[(B1*(100-/4)+B2*/4]}{100}$$

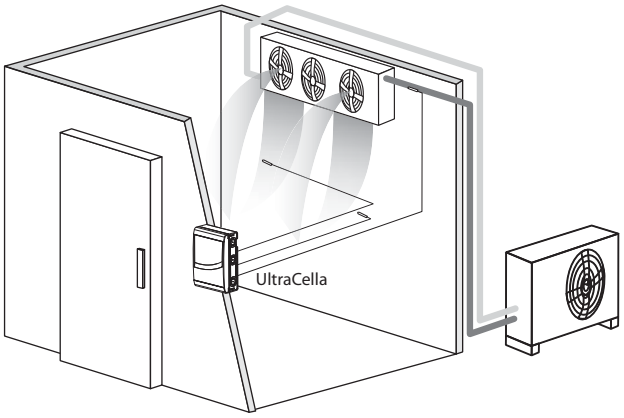


Fig. 6.a

Key

B1	Intake probe 1
B2	Intake probe 2

6.3 Set point

The reference output is the compressor (CMP).
The controller can operate in two different modes, that can be selected using parameter r3:

- direct with defrost;
- direct without defrost;

Par.	Description	Def	Min	Max	U.M.
St	Set point	0	r1	r2	°C/°F
rd	Differential	2.0	0.1	20	°C/°F
r1	Minimum set point	-50	-50	r2	°C/°F
r2	Maximum set point	60	r1	200	°C/°F
r3	Operating mode 0 Direct with defrost 1 Direct without defrost	0	0	1	-

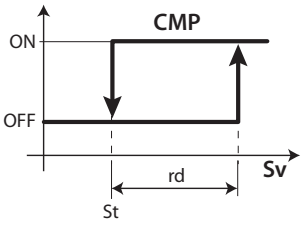


Fig. 6.b

Key

St	Set point
rd	Differential
Sv	Virtual probe
CMP	Compressor

If you have activated the second compressor output (H1, H5 = 13, 14) on AUX output, the activation of the compressor is at St + rd/2 and that of the auxiliary compressor AUX in St + rd, according to the figure below.

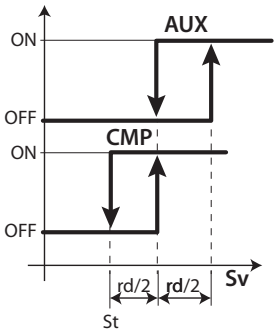


Fig. 6.c

Key

St	Set point
rd	Differential
Sv	Virtual probe
CMP	Compressor
AUX	Auxiliary output

6.4 Pump down

The pump down has the aim to completely empty the evaporator of the refrigerant at each stop of the compressor. After this phase, you can safely turn off the compressor, so that the liquid is not present the next time the compressor is started. When the set point is reached, the control closes the pump down valve to stop the flow of refrigerant to the evaporator, and, after a certain time, the compressor. In the application diagram there are the pump down valve and the low pressure switch. When the control requires turning on the compressor, if the safety periods c1 and c2 have passed, the pump down valve is opened and after the time set in parameter c8 the compressor is activated.

Par.	Description	Def	Min	Max	U.M.
c7	Maximum pump down time (PD) 0 = Pump down disabled.	0	0	900	s
c8	Compressor start delay after opening of pump down valve PD	5	0	60	s
H1	Configuration of output AUX1 …5 = pump down valve	1	0	15	-
H5	Configuration of output AUX2 …5 = pump down valve	1	0	15	-

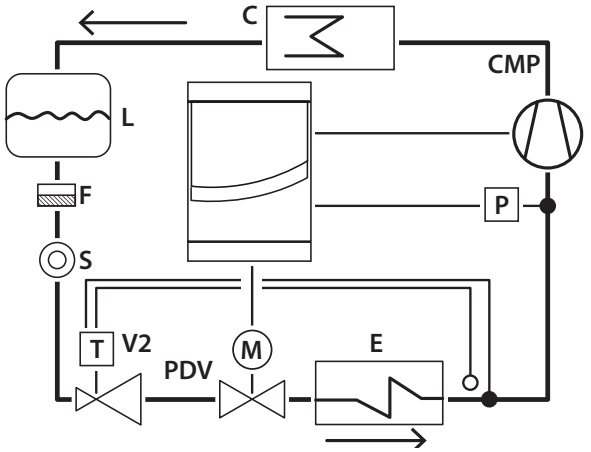


Fig. 6.d

Key

CMP	Compressor
C	Condenser
L	Liquid receiver
P	Low pressure switch
F	Dehydrator filter
E	Evaporator
S	Liquid indicator
V2	Thermostatic expansion valves
PDV	Pump down valve

You can select the pump down:

- on pressure (pressure switch mandatory): once the pump down valve closes, the compressor continues to operate until reaching the low pressure value (contact opened). At this point the compressor is turned off. If the pressure switch does not change within the time c7, alarm "Pd" triggers, pump down ended due to time-out. The Pd alarm is reset automatically if in the next pump down low pressure is reached within the time c7.
- on time (pressure switch optional): after the valve closes, the compressor operates for the time c7. The 'Pd' alarm, Pump down ended by time-out, is deactivated.

c10 = 0: Pressure pump down

Pressure switch changes within c7

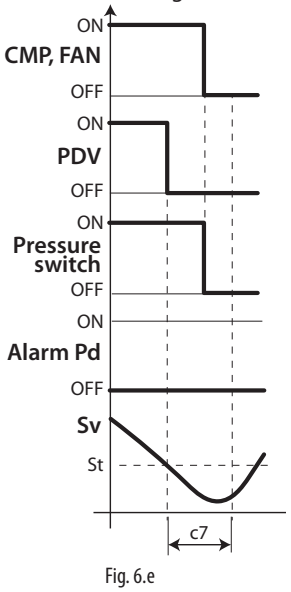


Fig. 6.e

Pressure switch changes after c7

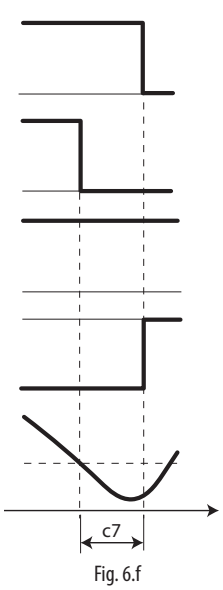


Fig. 6.f

Key

CMP, FAN	Compressor, fan
PDV	pump down valve
Pressure switch	Pressure switch
Sv	Virtual probe
c7	Pump down maximum time
Pd	Pump down alarm
t	Time
St	Set point

Note:

- if during the pump down there is a new demand for cooling, the pump down procedure terminates, and the pump down valve is opened (the compressor is already on from the previous pump down phase);
- in case of "Pd" alarm the auto-start function is disabled.

6.5 Autostart in pump down

As seen in the previous paragraph, once you reach the set point, the control closes the pump down valve and then the pressure switch changes and signals low pressure. If, due to problems of sealing of the valve, the pressure switch changes again, you can reactivate the compressor with the Auto start function, signalled by the message "Ats". This message is erased on the next correct pump down cycle

Par.	Description	Def	Min	Max	U.M.
c9	Autostart in pump down	0	0	1	-
	0 whenever pump down valve closes				
	1 whenever pump down valve closes & every request of low pressure switch without regulation request				

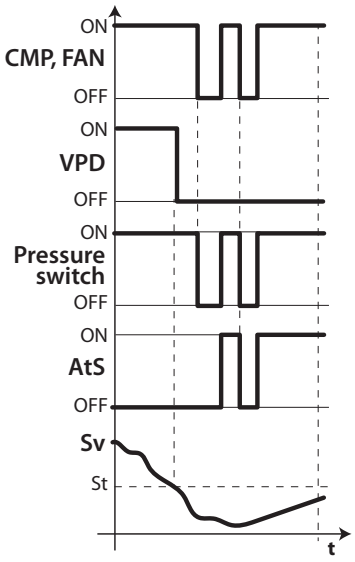


Fig. 6.g

Note: low pressure = pressure off/open.

Key

CMP, FAN	Compressor, fan	t	Time
VPD	Pump down valve	AtS	Autostart in pump down
St	Set point	Pressure switch	Pressure switch
Sv	Control probe		

Notes:

- at compressor autostart, the safety times c1 and c2, not c3 are respected;
- the message "AtS" is reset automatically on the next correct pump down cycle.

6.6 Continuous cycle

To activate the continuous cycle by keyboard see Chapter 3 (parameter value cc> 0). During operation in a continuous cycle, the compressor continues to operate regardless the control, for the time "cc", to lower the temperature even below the set point. The continuous cycle is stopped after the time "cc" or when reaching the minimum specified temperature, corresponding to the minimum temperature alarm threshold (AL). If, after the end of the continuous cycle, the temperature falls below the minimum temperature threshold, the low temperature alarm signal can be ignored by suitably setting the c6 parameter: the alarm bypass delay time after continuous cycle.

Par.	Description	Def	Min	Max	U.M.
cc	Continuous cycle duration	0	0	15	hour
c6	Low temperature alarm delay after continuous cycle	2	0	250	hour
A5	Digital input configuration 2 (DI2) … 14 = Continuous cycle activation	0	0	14	-
A9	Digital input configuration 3 (DI3) … 14 = Continuous cycle activation	0	0	14	-

6.7 Door switch control

See chap. 4

6.8 Defrost

Introduction

These parameters (dd1…dd8) can be used to set up to 8 defrost events linked to the system clock (RTC)

Par.	Description	Def	Min	Max	U.M.
dd1…8	Defrost 1…8: day 0 Disabled 1…7 Monday…Sunday 8 From Monday to Friday 9 From Monday to Saturday 10 Saturday and Sunday 11 Daily	0	0	11	-
hh1…8	Defrost 1…8: hour	0	0	23	hour
nn1…8	Defrost 1…8: minute	0	0	59	min.

UltraCella allows you to manage the following types of defrost, depending on parameter d0:

0. electric heater defrost by temperature (placed near the evaporator);
1. hot gas defrost by temperature.
2. electric heater defrost by time;
3. hot gas defrost by time.

Note: Ed1 and Ed2 indicate that the defrost ended due to time-out.

The end of the defrost cycle can be by temperature, and in this case it is necessary to install the defrost probe Sd (to select between B2 and B3) or by time. In the first case the defrost ends if the probe Sd measures a value greater than the value of dt1 or dP1 time has elapsed, in the second case if the defrosting phase exceeds the maximum time dP1. At the end of the defrost the controller can enter in dripping status (present if dd> 0), in which the compressor and the fans are turned off, and subsequently in the state of post-dripping (if present Fd> 0), in which the control resumes with fans off. You can choose the display on the user terminal during defrost, using parameter d6.

Par.	Description	Def	Min	Max	U.M.
d0	Type of defrost 0 Heater by temperature 1 Hot gas by temperature 2 Heater by time 3 Hot gas by time	0	0	3	-
dt1	End defrost temperature, main evaporator	4	-50	200	°C/°F
dt2	End defrost temperature, auxiliary evaporator	4	-50	200	°C/°F
dP1	Maximum defrost duration	30	1	250	min
dP2	Maximum defrost duration, auxiliary evaporator	30	1	250	min
d6	Terminal display during defrost 0 = Temperature alternated with dEF 1 = Last temperature shown before defrost 2 = dEF	1	0	2	-

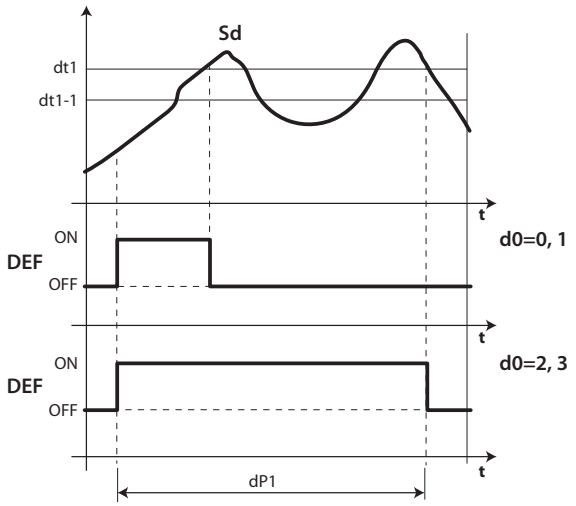


Fig. 6.h

Key

t	Time
dt1	End of defrost temperature
dP1	Maximum defrost duration
Sd	Defrost Probe
d0	Type of defrost
DEF	Defrost

1. electric heater defrost (d0 = 0, 2): operating cycle.

The operating cycle refers to default values of the parameters F2 and F3.

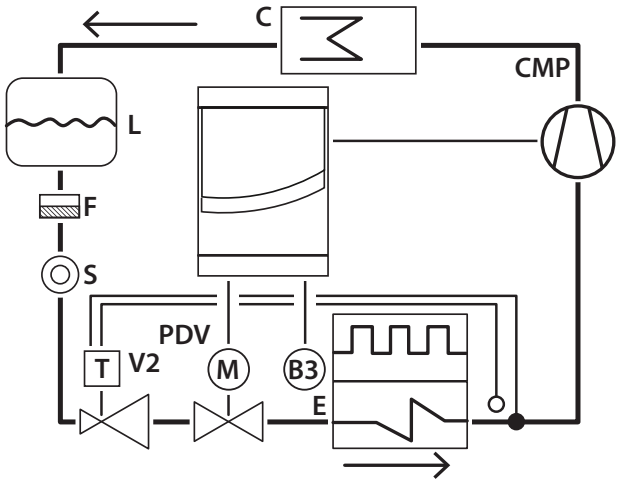


Fig. 6.i

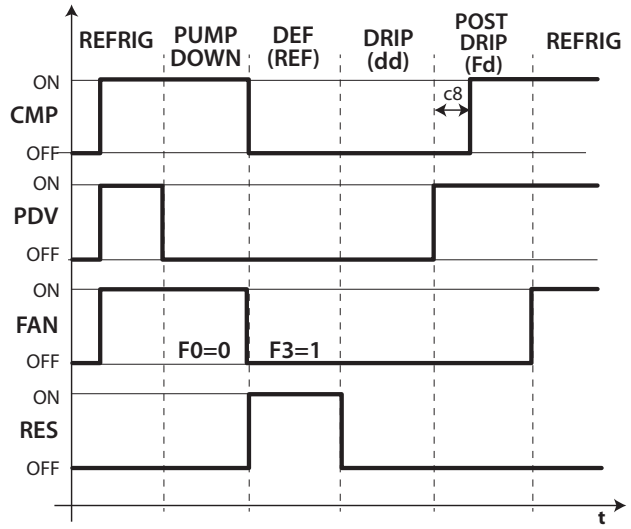


Fig. 6.j

Key

CMP	Compressor
Refrig	Refrigeration
PDV	Pump down valve
Pump down	Pump down phase
FAN	Evaporator fan
Def	Defrost
RES	Resistance (defrost heater)
Drip	Drip
E	Evaporator
Post drip	Post drip
C	Condenser
V2	Thermostatic expansion valve
F	Dehydrator filter
t	Time
B3	Defrost probe
L	Liquid receiver
S	Liquid indicator

Note:

- in pump-down the fan activation is determined by F0;
- in defrost the fan activation is determined by F3.

2. hot gas defrost (d0 = 1, 3): operating cycle.

The operating cycle refers to default values of the parameters F2 and F3.

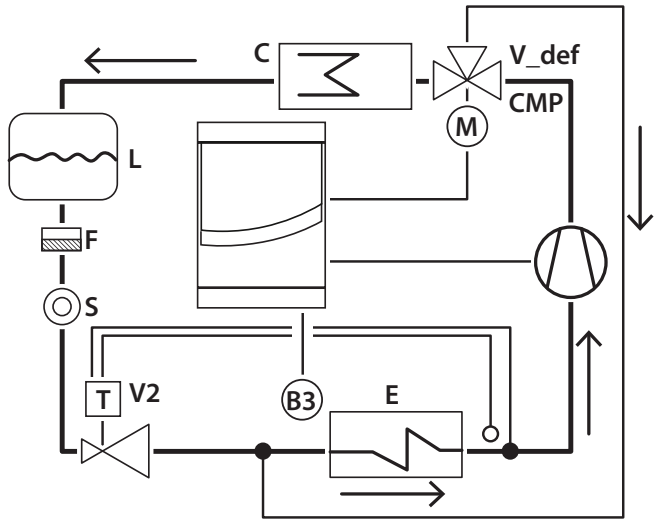


Fig. 6.k

Note: the defrost output (DEF) is used for command of the hot gas valve V_def.

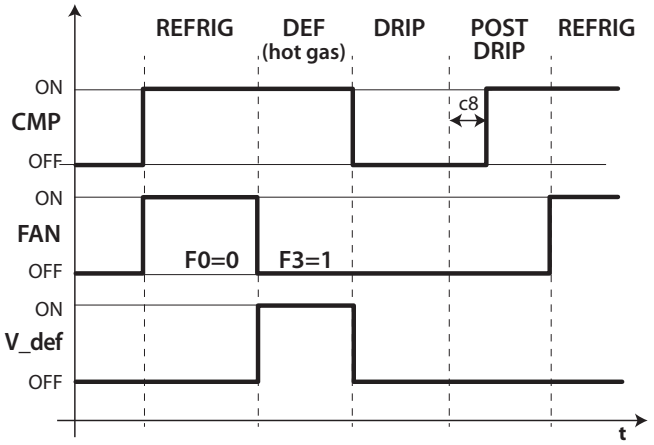


Fig. 6.l

Key

CMP	Compressor
Refrig	Refrigeration
FAN	Evaporator fan
Def	Defrost
V_def	Hot gas valve
Drip	Drip
E	Evaporator
Post drip	Post drip
C	Condenser
B3	Defrost probe
V2	Thermostatic expansion valve
L	Liquid receiver
F	Dehydrator filter
S	Liquid indicator
t	Time

The defrost is activated, upon priority:

- from keyboard, using the defrost key;
- from clock, setting the event and the starting mode, with maximum 8 defrosts a day (parameters dd1...dd8);
- setting the cyclic range "dI";
- from digital input;
- from supervisor.

The defrost is disabled:

- defrost by temperature: when the defrost probe detects a temperature greater than the defrost end temperature dt1;
- defrost by time: in the absence of the defrost probe, the defrost ends after the maximum time set by parameter dP1.

6.8.1 Maximum period of time between consecutive defrosts

Par.	Description	Def	Min	Max	U.M.
dI	Maximum interval between consecutive defrosts 0 = defrost not performed	8	0	250	hour

The parameter dI is a security parameter that allows cyclical defrosts every "dI" hours even in the absence of the Real Time Clock (RTC). At the beginning of each defrost cycle, regardless of duration, a count is started. If the dI time is exceeded without performing any defrost, the defrost is automatically activated. The counter remains active even if the controller is off.

Example: in case of failure for example at RTC the scheduled defrost by td3 (= dd3, hh3, nn3) is not made, after the safety time dI starts a new defrost.

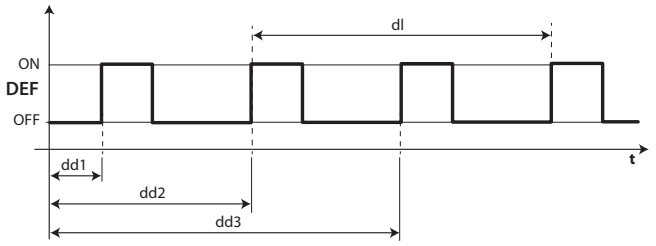


Fig. 6.m

Key

dI	Maximum interval of time between consecutive defrosts
dd1…dd3	Scheduled defrosts
DEF	Defrost
t	Time

Note:

- if the interval dI expires when the controller is OFF, when it is started again a defrost is performed;
- to ensure regular defrosts, the interval between defrosts must be greater than the maximum defrost duration, plus the dripping time and post-dripping time;
- if setting dI=0 the defrost is performed only if activated from keyboard or by setting the scheduled defrosts (ddi).

6.8.2 Other defrost parameters

Par.	Description	Def	Min	Max	U.M.
d3	Defrost activation delay	0	0	250	min
d4	Defrost at start-up 0/1=No/Yes	0	0	1	-
d5	Defrost delay at start-up	0	0	250	min
d8	High temperature alarm delay after defrost (and door open)	1	0	250	hour
dpr	Defrost priority over continuos cycle 0/1=No/Yes	0	0	1	-

- d3 determines the time that must elapse, when the defrost is activated, between the stopping of the compressor (electric heater defrost) or the starting of the compressor (hot gas defrost), and the activation of the defrost relays on the main and auxiliary evaporators. In the hot gas defrost, the delay d3 is useful for ensuring a sufficient amount of hot gas before activation of the hot gas valve;
- d4 determines whether to activate or not the defrost at the controller start-up. The defrost at start-up request has priority over the activation of the compressor and the continuous cycle. Force a defrost at controller start-up may be useful in special situations.

Example: frequent power drops inside the plant. In case of lack of voltage the tool resets the inner clock that calculates the period of time between two defrosts, starting from zero. If, in an extreme case, the frequency of the power failure were greater than the defrost frequency (e.g. a power failure every 8 hours, against a defrost every 10 hours) the controller would never perform a defrost. In a situation of this type, it is preferable to activate defrost on start-up, above all if the defrost is controlled by temperature (probe on the evaporator), therefore avoiding unnecessary defrosts or at least reducing the running times. In the case of systems with a large number of units, if selecting defrosts at start-up, after a power failure all the units will start defrosting, thus causing a voltage overload. This can cause power overload. To overcome this, the parameter d5 can be used. It adds a delay before the defrost, and this delay must obviously be different for each unit.

- d5 represents the time that elapses between the start of the controller and the start of the defrost at start-up;
- dd is used to force the stop of the compressor and the evaporator fan after a defrost cycle in order to facilitate the evaporator dripping;
- d8 indicates the time of exclusion of the high temperature alarm signalling from the end of a defrost;
- if dpr = 0, the defrost and the cycle have the same priority; if dpr = 1, if the continuous cycle is in progress and a defrost request intervenes, the continuous cycle ends and the defrost starts.

6.9 Evaporator Fans

6.9.1 Fixed speed fans

The status of the fans depends on the compressor status.
When the compressor is:

- on: the fan can also be on (F0=0) or activated based on the evaporator temperature, virtual probe Sv, based on the formula:

$$\text{if } Sd \le (Sv - F1) - Frd \quad \text{--> FAN = ON}$$
$$\text{if } Sd \ge (Sv - F1) \quad \text{--> FAN = OFF}$$

- off: the fan is controlled by a PWM that has duty cycle with a fixed period of 60 minutes.

$$\text{duty_cycle} = \frac{F2}{60}$$

Par.	Description	Def	Min	Max	U.M.
F0	Evaporator fan management 0 = always on with compressor on 1= activation depends on Sd, Sv	0	0	2	-
F1	Fan activation temperature	5	-50	200	°C/°F
F2	Fan activation time with CMP off	30	0	60	min
HO1	Output Y1 configuration 0 = not active	0	0	2	-

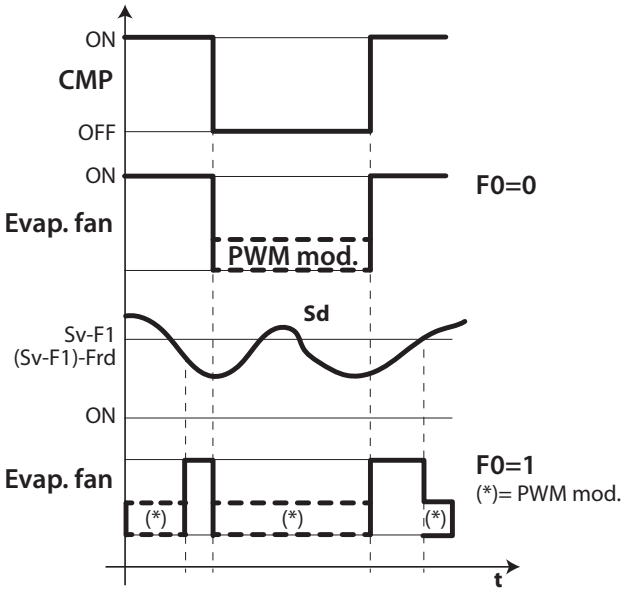


Fig. 6.n

Key

CMP	Compressor
PWM mod.	PWM modulation
F1	Fan activation threshold
Frd	Fan activation differential
Evap.fan	Evaporator fan
t	Time
Sv	Virtual probe
Sd	Defrost probe

The fan can be stopped:

- when the compressor is off (parameter F2);
- during defrost (parameter F3).

6.9.2 Variable speed fans

The installation of variable speed fans may be useful to optimise energy consumption. In this case, the fans are powered by the mains, while the control signal is provided by UltraCella by analogue output Y1 0…10 Vdc.

The maximum and minimum fan speed can be set using F6 and F7 parameters (in percentage respect range 0…10V). If using the fan speed controller, F5 represents the temperature below which the fans are activated, with a fix hysteresis of 1°C.

Par.	Description	Def	Min	Max	U.M.
F5	Evaporator fans cut-off temperature (hysteresis 1°C)	15	-50	50	°C/°F
F6	Maximum fans speed	100	F7	100	%
F7	Minimum fans speed	0	0	F6	%

To enable the algorithm, it's necessary to select variable speed fans mode (F0=2) and set analogue output 0…10 Vdc (HO1=2).

Par.	Description	Def	Min	Max	U.M.
F0	Evaporator fans management … 2 = variable speed fans	0	0	2	-
HO1	Output Y1 0…10 V configuration … 2 = variable speed fans regulated on Sd	0	0	2	-

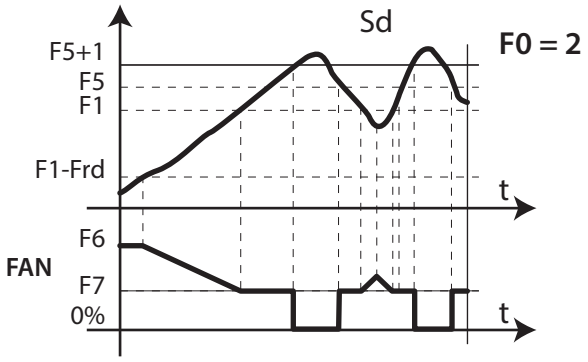


Fig. 6.o

Evaporator Fan (analog output) F0= 2

Key

Sd	Evaporator probe
F0	Evaporator fans management
F1	Fan start temperature
Frd	Fan activation differential

Note:

- if two evaporator probes are configured (Sd1 and Sd2), speed fans is calculated in relation to probe which is measuring higher temperature (to limit hot air flow):
  if Sd1>Sd2 → regulation on Sd1;
  if Sd1<Sd2 → regulation on Sd2.

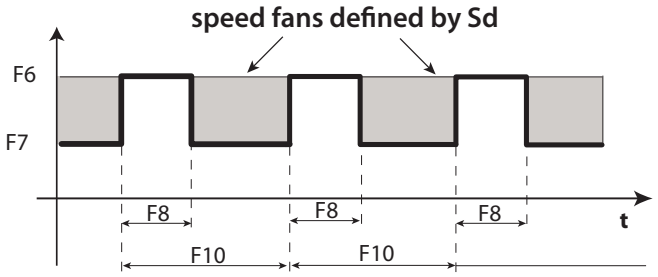
In case of defrost probe failure, speed fans is fixed to maximum value defined by parameter F6.

- If F0=2 and HO1=2, speed fan is calculated in according to Figure 6.o. Anyway, if speed fan is higher than 0, "FAN" relay DO3 is ON anyhow (closed):
  if speed fan (Y1) > 0V → "FAN" relay ON (DO3 closed)
  if speed fan (Y1) = 0V → "FAN" relay OFF (DO3 open)

- If F0=0,1 (fixed speed fans by "FAN" relay DO3), analogue output is set to 0 (Y1=0V)
- Inside modulation interval (F1-Frd < Sd < F1), speed fan is modulated in proportional way (e.g. Sd=F1-Frd/2 → Y1 correspond to (F6+F7)/2 percentage)

Because of mechanical inertia of motor, some EC fans cannot start with a low speed set by parameter F7. To overcome this, fans can be started with maximum speed set by parameter F7 for a "peak time" defined by parameter F8, irrespectively of Sd temperature.
On the other hand, if fans operates for too long time at a reduced speed, ice can form on the blades. To avoid this, at interval of F10 minutes, fans are forced to maximum speed for "peak time" defined by F8

Par.	Description	Def	Min	Max	U.M.
F8	Fans peak time 0 = function disabled	0	0	240	s
F10	Evaporator fans forcing time at maximum speed 0 = function disabled	0	0	240	min



Note: Cyclic time at maximum speed (determined by both F8 and F10) is not allowed when door is open.

6.9.3 Evaporator fans during defrost

There is the possibility to force the start of the evaporator fans during control (parameter F2) and during defrost (parameter F3). During the dripping periods (parameter dd > 0) and post-dripping periods (parameter Fd > 0) the evaporator fans are always off. This is useful to allow the evaporator to return to normal temperature after defrosting, thus avoiding forcing hot air on evaporator. dd is used to force the stop of the compressor and the evaporator fan after a defrost cycle in order to facilitate evaporator dripping.

Par.	Description	Def	Min	Max	U.M.
F2	Fan activation time with CMP off	30	0	60	min
F3	Evaporator fans during defrost 0/1=on/off	1	0	1	-
Fd	Post dripping time (fans off)	1	0	30	min
F4	Humidity output during defrost 0/1 = ON/OFF	1	0	1	-
dd	Dripping time after defrost (fans off)	2	0	30	min

6.10 Condenser fans

The condenser fans are activated based on parameters FC4 and A0, after configuring the digital output AUX or the analog output.

Par.	Description	Def	Min	Max	U.M.
FC4	Condenser fan deactivation temperature	40	-50	200	°C/°F
A0	Alarm and fan differential	2.0	0.1	20	°C/°F

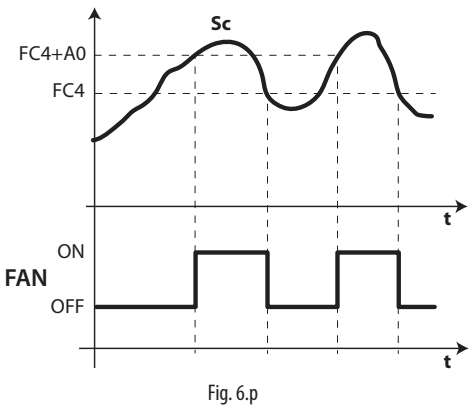


Fig. 6.p

Key

Sc	Condenser probe
FAN	Condenser fans
FC4	Turn off temperature
t	Time
A0	Differential

Note: if an alarm triggers at condenser probe, the output condenser fan is always on.

6.11 Duty setting

In the event the alarm "rE" (virtual control probe fault), the parameter is used to ensure the operation of the compressor until the fault is resolved. The compressor cannot be activated according to the temperature (due to the faulty probe), it is activated cyclically with a time of operation (ON) equal to the value assigned to c4 and a switch-off time (OFF) fixed at 15 minutes .

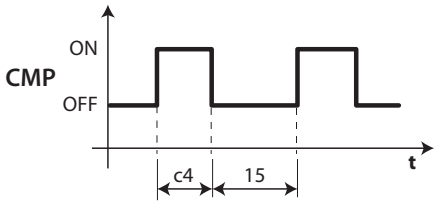


Fig. 6.q

Par.	Description	Def	Min	Max	U.M.
c4	Compressor running time in duty setting	0	0	100	min

6.12 Bowl resistance

The resistor is used to heat the collection tank after the defrosting phase, to prevent the ice from blocking the passage of water.
The resistance is activated for 3 minutes before the programmed defrost or simultaneously with a manual defrost. The resistance is always off after the defrost phase.

Par.	Description	Def	Min	Max	U.M.
H1	Configuration of output AUX1 … 3 = bowl resistance activation	1	0	15	-
H5	Configuration of output AUX2 … 3 =bowl resistance activation	1	0	15	-

6.13 Defrosting with 2 evaporators

You can configure up to 2 defrost probes and up to 2 evaporator outputs. The control recognizes the configuration based on the following table (probe 1 is the control probe and cannot be configured)

DEFROST PROBES AND EVAPORATORS OUTPUT CONFIGURATION

Case	Defrost probes	Evaporator outputs	Notes
1	B2	Evap. 1	B2 acts on the evap. 1
2	B2	Evap. 1 and 2	B2 acts on the evap. 1
3	B2 and B3	Evap. 1	B2 and B3 act on evap. 1 (start and end of defrost based on the minimum value probe)
4	B2 and B3	Evap. 1 and 2	B2 acts on the evap. 1 and B3 act on evap. 2

Tab. 6.b

CASE 4: 2 PROBES AND 2 EVAPORATORS

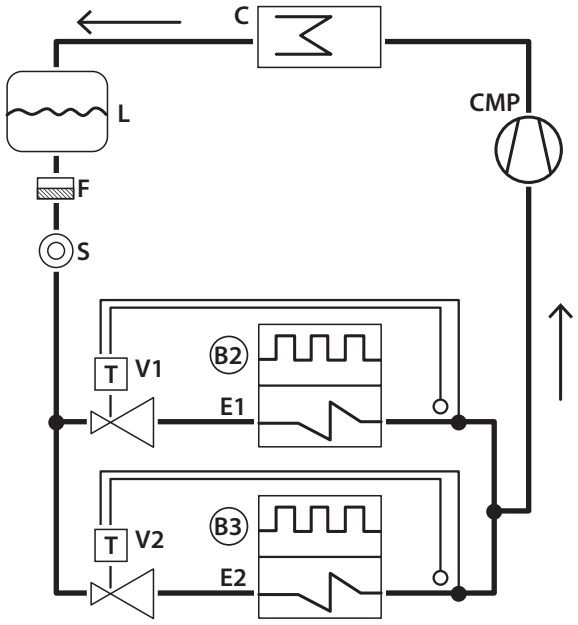


Fig. 6.r

Key

E1/2	Evaporator 1/2
C	Condenser
V1/2	Thermostatic expansion valve 1/2
L	Liquid Receiver
B2/B3	defrost probe 2, 3
CMP	Compressor
F	Filter drier
S	Liquid indicator

6.14 Second compressor with rotation

Second compressor output with double step control with rotation: the compressors will be turned on as follows:
- alternately for single step requests (as in example 3)
- the first to be turned on will be the first to be turned off for the 2 steps requests (as in examples 1, 2 and 4)

Par.	Description	Def	Min	Max	U.M.
H1/H5	Configuration of output AUX1/AUX2 0 = alarm normally energised … 13 = second compressor step with rotation	1	0	15	

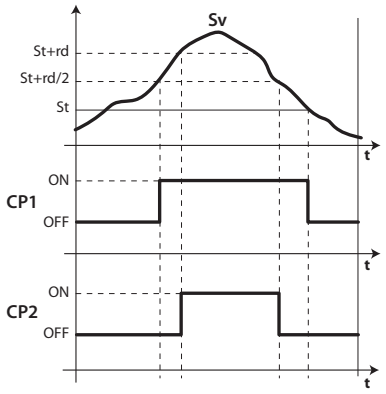


Fig. 6.s

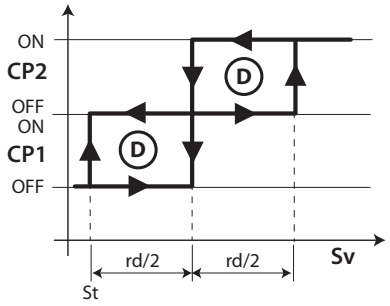


Fig. 6.t

Key

SV	Virtual probe
CP1	Compressor 1
t	time
CP2	Compressor 2
rd	Differential
St	Set point

Operation examples: (NOTE: REQ1: Sv > St + rd/2; REQ2: Sv > St + rd)

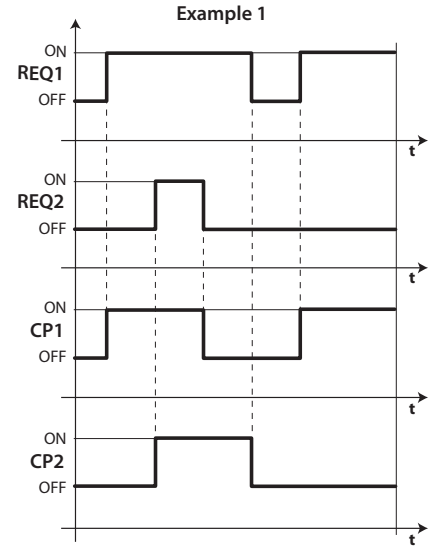


Fig. 6.u

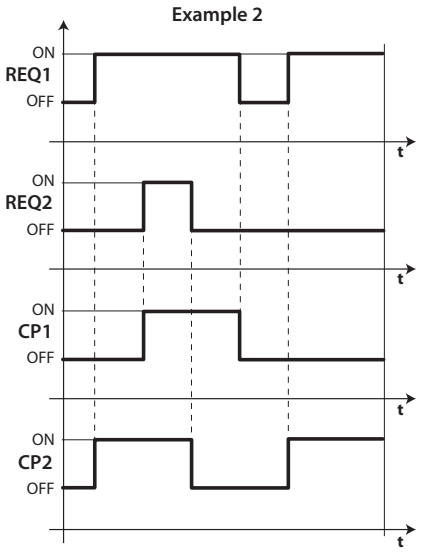


Fig. 6.v

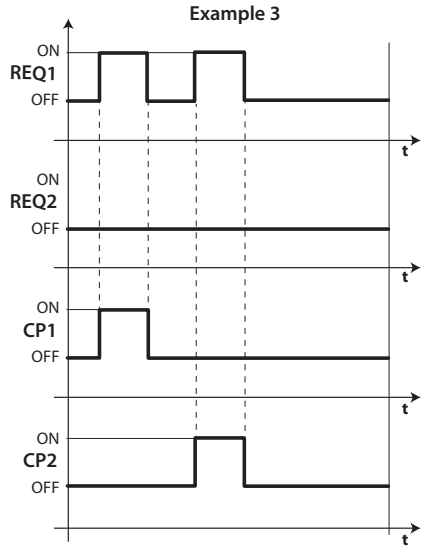


Fig. 6.a

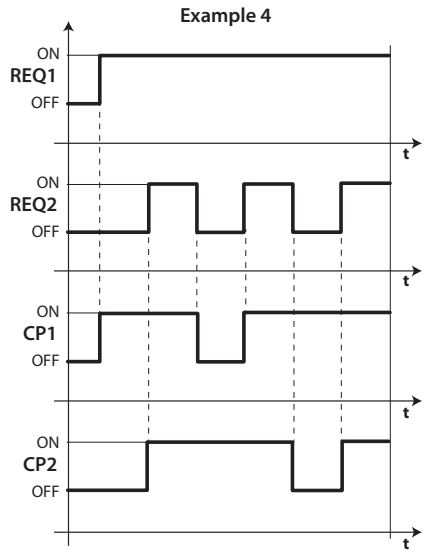


Fig. 6.b

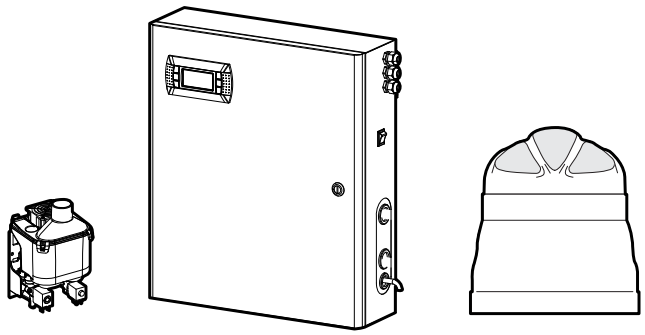
Key

REQ1	request 1
REQ2	request 2
t	time
CP1	compressor 1
CP2	compressor 2

6.15 Humidity management

UltraCella can interact with CAREL humidification systems, managing the humidity level in combination with cooling control.
The humidity must be read from UltraCella, configuring an analogue input (B4 or B5) as a 0 to 10 V or 4 to 20 mA input for humidity probes. The controller can display the humidity read by the probe and, by suitably configuring one of the auxiliary outputs, AUX1 or AUX2, activate an external CAREL humidifier to adjust the humidity level accordingly.

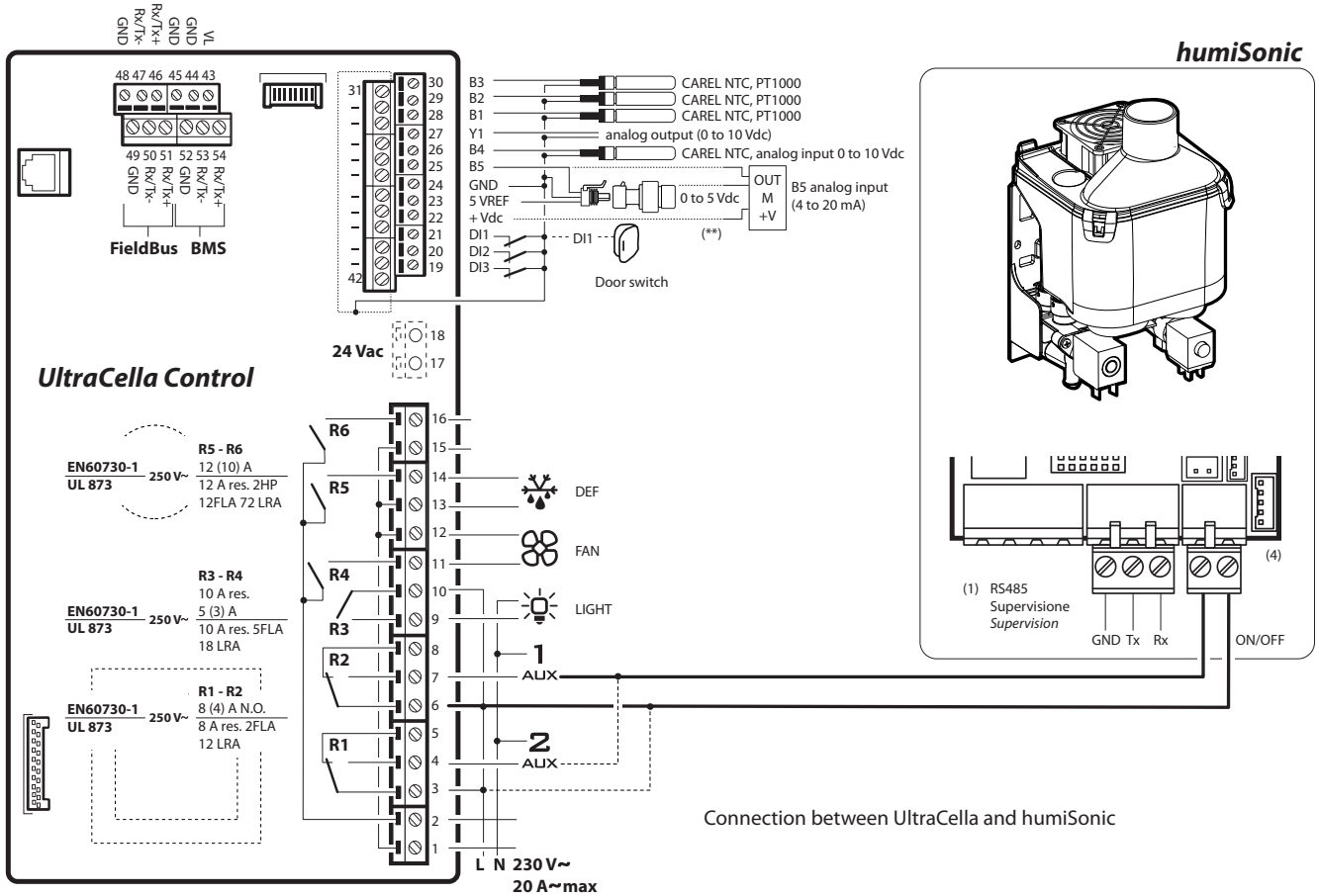
Carel Humidification systems are compatible with UltraCella



humiSonic mc multizone humiDisk

Fig. 6.w

Wiring diagram between UltraCella and humiSonic



Connection between UltraCella and humiSonic

Fig. 6.x

6.15.1 Analogue input configuration for humidity probes

Either analogue input B4 or B5 needs to be configured a humidity probe input.

Par.	Description	Def	Min	Max	U.M.
/P4	B4 configuration … 2 = 0 to10V	0	0	2	-
/P5	B5 configuration … 0 = 4 to 20mA	0	0	0	-

Par.	Description	Def	Min	Max	U.M.
/A4	B4 configuration … 2 = humidity probe (Su)	0	0	3	-
/A5	B5 configuration … 1 = humidity probe (Su)	0	0	1	-

Example:
Humidity probe with 0 to 10 V output -> connect the probe to input B4 and set
- /P4=2
- /A4=2

Humidity probe with 4 to 20 mA output -> connect the probe to input B5 and set
- /P5=0
- /A5=1

6.15.2 Display humidity reading on UltraCella

On models with single row display, P/Ns WB000S*, the humidity can be displayed instead of the cold room temperature, selecting:
- Humidity probe with 0 to 10 V output -> /t1=10 (B4)
- Humidity probe with 4 to 20 mA output -> /t1 = 11 (B5)

Par.	Description	Def	Min	Max	U.M.
/t1	Variable 1 on the display … 10 = B4 11 = B5	1	0	11	-

On models with double row display, P/Ns WB000D*, the humidity can be displayed on the second row as the second process selecting:
- Humidity probe with 0 to 10 V output -> /t2=10 (B4)
- Humidity probe with 4 to 20 mA output -> /t2 = 11 (B5)

Par.	Description	Def	Min	Max	U.M.
/t2	Variable 2 on the display (second row) … 10 = B4 11 = B5	6	0	12	-

6.15.3 AUX1 / AUX2 auxiliary output configuration and basic humidity control logic

To activate the humidifier connected to UltraCella, configure one of the auxiliary outputs AUX1 or AUX2 for humidity control.

Par.	Description	Def	Min	Max	U.M.
H1	AUX1 output configuration … 15 = humidity output	1	0	15	-
H5	AUX2 output configuration … 15 = humidity output	1	0	15	-

Basic humidity control logic: if the humidity measured is less than the set point StH, the relay activates the externally connected humidifier (REVERSE action, standard ON/OFF with differential).

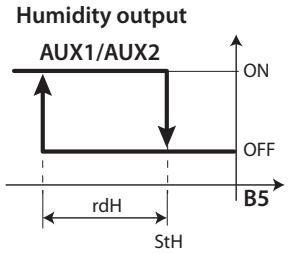


Fig. 6.y

Key

StH	Humidity set point
rdH	Humidity differential
B5	Probe B5 configured as 4 to 20 mA humidity probe

Par.	Description	Def	Min	Max	U.M.
StH	Humidity set point	90.0	0.0	100.0	%rH
rdH	Humidity differential	5.0	0.1	20.0	%rH

Note:

1. If the temperature inside the cold room is less than 2°C (virtual control temperature Sv) -> humidifier activation (AUX1/AUX2 relay) is always disabled (with a fixed hysteresis of 1°C).
2. Humidity control can be disabled during the defrost (parameter F4):
   - F4=0 -> humidity control enabled based on humidity set point StH;
   - F4=1 -> humidity control not enabled: during defrost, the external humidifier will not be activated.
3. Humidifier activation (AUX1/AUX2 relay) is always disabled in the event of an alarm that immediately stops the compressor. Examples:
   - CHT alarm;
   - LP alarm (after 3 times);
   - IA alarm (when A6=0).

Par.	Description	Def	Min	Max	U.M.
F4	Humidifier relay during defrost 0 = relay enabled in defrost (based on StH) 1 = relay not enabled in defrost	1	0	1	-

7. PARAMETERS TABLE

Type of variable: A = analogue, I = integer, D = digital

Par.	Description	Def	Min	Max	UOM	Type	CAREL SVP	R/W	page
Pro									
/21	Probe measurement stability probe 1	4	0	9	-	I	12	R/W	34
/22	Probe measurement stability probe 2	4	0	9	-	I	13	R/W	34
/23	Probe measurement stability probe 3	4	0	9	-	I	14	R/W	34
/24	Probe measurement stability probe 4	4	0	9	-	I	15	R/W	34
/25	Probe measurement stability probe 5	4	0	9	-	I	16	R/W	34
/4	Virtual probe composition 0 = probe B1 100= probe B2	0	0	100	-	I	17	R/W	37
/5t	Temperature unit of measure 0/1 = °C for temperature and Bar for pressure sensors / °F for temperature and psi for pressure sensors of EVD (if present)	0	0	1	-	I	18	R/W	35
/6	Display decimal point 0/1 = yes/no	0	0	1	-	D	19	R/W	35
/t1	Display variable 1 0 None; 1 Virtual probe (Sv); 2 Outlet probe (Sm); 3 Intake probe (Sr); 4 Defrost probe 1 (Sd1); 5 Defrost probe 2 (Sd2); 6 Set point; 7 B1; 8 B2; 9 B3; 10 B4; 11 B5	1	0	11	-	I	67	R/W	34 46
/t2	Display variable 2 (*) 0 None.; 1 Virtual probe (Sv); 2 Outlet probe (Sm); 3 Intake probe (Sr); 4 Defrost probe 1 (Sd1); 5 Defrost probe 2 (Sd2); 6 Set point; 7 B1; 8 B2; 9 B3; 10 B4; 11 B5; 12 rd; 13 Superheat; 14 Valve opening %; 15 Valve opening step	6	0	15	-	I	68	R/W	34 46
/P	Type B1 to B3 0 NTC Standard range -50T90°C 1 NTC extended range 0T150°C 2 PT1000	0	0	2	-	I	20	R/W	31
/A2	B2 configuration 0 Absent 1 Defrost probe 1 (Sd1) 2 Intake probe (Sr)	0	0	2	-	I	21	R/W	31
/A3	B3 configuration 0 Absent 1 Defrost probe 2 (Sd2) 2 Condenser probe (Sc) 3 Defrost probe 1 (Sd1)	0	0	3	-	I	22	R/W	31
/P4	Type B4 0 NTC Standard range -50T90°C 1 NTC Extended range 0T150°C 2 0…10 V	0	0	2	-	I	23	R/W	31 46
/A4	B4 configuration 0 Absent 1 Ambient temperature probe 2 Humidity probe 3 Recording probe (Src)	0	0	3	-	I	24	R/W	31 46
/P5	Type B5 0 4 … 20 mA	0	0	0	-	I	25	R/W	31 46
/A5	B5 configuration 0 Absent 1 Humidity probe	0	0	1	-	I	26	R/W	31 46
/C1	Offset B1	0	-20.0	20.0	°C/°F	A	7	R/W	31
/C2	Offset B2	0	-20.0	20.0	°C/°F	A	8	R/W	31
/C3	Offset B3	0	-20.0	20.0	°C/°F	A	9	R/W	31
/C4	Offset B4	0	-20.0	20.0	-	A	10	R/W	31
/C5	Offset B5	0	-20.0	20.0	-	A	11	R/W	31
St	Set point	0	r1	r2	°C/°F	A	12	R/W	37
rd	Differential	2.0	0.1	20	°C/°F	A	13	R/W	37
r1	Minimum set point	-50.0	-50.0	r2	°C/°F	A	14	R/W	37
r2	Maximum set point	60.0	r1	200	°C/°F	A	15	R/W	37
r3	Operating mode 0 direct with defrost 1 direct without defrost	0	0	1	-	D	11	R/W	37
StH	Humidity setpoint	90.0	0.0	100.0	%rH	A	28	R/W	46
rdH	Humidity differential	5.0	0.1	20.0	%rH	A	29	R/W	46

(*): can be viewed only on UltraCella Sevice Terminal or on the controller with double row display.

Par.	Description	Def	Min	Max	UOM	Type	CAREL SVP	R/W	page
CMP									
c0	Compressors/fan start delay at power on	0	0	15	min	I	31	R/W	36
c1	Minimum time between compressor starts	6	0	15	min	I	32	R/W	33
c2	Minimum compressor off time	3	0	15	min	I	33	R/W	33
c3	Minimum compressor on time	3	0	15	min	I	34	R/W	33
c4	Compressor running time in duty setting	0	0	100	min	I	35	R/W	43
cc	Continuous cycle duration	0	0	15	hour	I	36	R/W	39
c6	Low temperature alarm delay after continuous cycle	2	0	250	hour	I	37	R/W	39
c7	Maximum pump down (PD) time 0 = Pump down disabled	0	0	900	s	I	38	R/W	38
c8	Compressor start delay after opening of pump down valve	5	0	60	s	I	39	R/W	38
c9	Autostart in pump down 0/1 = whenever pump down valve closes/ whenever pump down valve closes & every request of low pressure switch without regulation request	0	0	1	-	D	13	R/W	38
c10	Pump down by time/pressure 0/1 = pressure/ time	0	0	1	-	D	12	R/W	38
c11	Second compressor start delay	4	0	250	s	I	40	R/W	36
FC4	Condenser fan deactivation temperature	40.0	-50.0	200.0	°C/°F	A	16	R/W	42
dEF									
d0	Type of defrost 0 Heater by temperature 1 Hot gas by temperature 2 Heater by time 3 Hot gas by time	0	0	3	-	I	41	R/W	33 39
dI	Max interval between consecutive defrosts 0 = defrost not performed	8	0	250	hour	I	42	R/W	40
dt1	End defrost temperature, main evaporator	4.0	-50.0	200.0	°C/°F	A	17	R/W	33 39
dt2	End defrost temperature, auxiliary evaporator	4.0	-50.0	200.0	°C/°F	A	18	R/W	39
dP1	Maximum defrost duration	30	1	250	min	I	43	R/W	33 39
dP2	Maximum defrost duration, auxiliary evaporator	30	1	250	min	I	44	R/W	39
dd	Dripping time after defrost	2	0	30	min	I	45	R/W	33
d3	Defrost activation delay	0	0	250	min	I	46	R/W	41
dpr	Defrost priority over continuous cycle 0/1 = no/yes	0	0	1	-	D	15	R/W	41
d4	Defrost at start-up 0/1=no/yes	0	0	1	-	D	14	R/W	41
d5	Defrost delay at start-up	0	0	250	min	I	47	R/W	41
d6	Terminal display during defrost 0 Temperature alternated with dEF 1 Last temperature shown before defrost 2 dEF	1	0	2	-	I	49	R/W	39
d8	High temperature alarm delay after defrost (and door open)	1	0	250	hour	I	48	R/W	41
ALM									
A0	Alarm and fan differential	2.0	0.1	20.0	°C/°F	A	19	R/W	43 54
A1	Alarm thresholds relative to set point or absolute 0/1=relative/absolute	0	0	1	-	D	16	R/W	54
AL	Low temperature alarm threshold If A1=0, AL=0: alarm disabled If A1=1, AL=-50: alarm disabled	0.0	-50.0	200.0	°C/°F	A	20	R/W	54
AH	High temperature alarm threshold High temperature alarm threshold If A1=0, AH=0: alarm disabled If A1=1, AH=200: alarm disabled	0.0	-50.0	200.0	°C/°F	A	21	R/W	54
Ad	High/low temperature alarm delay	120	0	250	min	I	50	R/W	54
A5	Digital input 2 (DI2) configuration 0 Not active 1 Immediate external alarm 2 Do not select 3 Enable defrost 4 Start defrost 5 Do not select 6 Remote ON/OFF 7 Do not select 8 Low pressure switch 9 Do not select 10 Do not select 11 Do not select 12 Aux1 activation 13 Do not select 14 Continuous cycle activation	0	0	14	-	I	51	R/W	39
A6	Stop compressor on external alarm	0	0	100	min	I	53	R/W	54
A7	Low pressure (LP) alarm delay	1	0	250	min	I	54	R/W	32
A9	Digital input 3 (DI3) configuration 0 Not active 1 Immediate external alarm 2 Do not select 3 Enable defrost 4 Start defrost 5 Do not select 6 Remote ON/OFF 7 Do not select 8 Low pressure switch 9 Do not select 10 Do not select 11 Do not select 12 Aux2 activation 13 Do not select 14 Continuous cycle activation	0	0	14	-	I	52	R/W	39

Par.	Description	Def	Min	Max	UOM	Type	CAREL SVP	R/W	page
Ac	High temperature condenser alarm threshold	70.0	0.0	200.0	°C/°F	A	22	R/W	55
Acd	High temperature condenser alarm delay	0	0	250	min	I	56	R/W	55
A10	Low pressure alarm delay, compressor running	3	0	60	min	I	55	R/W	
Fan									
F0	Evaporator fan management 0 always on with compressor on 1 activation depends on Sd, Sv 2 variable speed fans	0	0	2	-	D	20	R/W	41 42
F1	Fan activation temperature	5.0	-50.0	200.0	°C/°F	A	23	R/W	33 41
Frd	Fan activation differential	2.0	0.1	20.0	°C/°F	A	24	R/W	41
F2	Fan activation time with compressor off	30	0	60	min	I	57	R/W	33 41
F3	Evaporator fan during defrost 0/1=on/off	1	0	1	-	D	17	R/W	33
Fd	Post dripping time (fans off)	1	0	30	min	I	60	R/W	33
F4	Humidity output during defrost 0/1 = ON/OFF	1	0	1	-	D	71	R/W	46
F5	Evaporator fans cut-off temperature (hysteresis 1°C)	15	-50	50	°C/°F	A	25	R/W	42
F6	Maximum fan speed	100	F7	100	%	I	58	R/W	42
F7	Minimum fan speed	0	0	F6	%	I	59	R/W	42
F8	Fans peak time 0 = disabled function	0	0	240	s	I	176	R/W	42
F10	Evaporator fans forcing time at maximum speed 0 = disabled function	0	0	240	min	I	177	R/W	42
CnF									
H0	Serial address	193	0	207	-	I	69	R/W	34
In	Type of unit 0 = Normal	0	0	0	-	-	-	R/W	
H1	AUX1 output configuration 0 Normally energized alarm 1 Normally deenergized alarm 2 Activation by AUX1 key or DI2 3 Bowl resistance activation 4 Auxiliary evaporator defrost 5 Pump down valve 6 Condenser fan 7 Delayed compressor 8 Do not select 9 Do not select 10 Do not select 11 Do not select 12 Do not select 13 Second compressor step 14 Second compressor step with rotation 15 Humidity output	1	0	15	-	I	61	R/W	36 46
H4	Buzzer 0/1 = enabled/ disabled	0	0	1	-	D	21	R/W	35
H5	AUX2 output configuration 0 Normally energized alarm 1 Normally deenergized alarm 2 Activation by AUX2 key or DI3 3 Bowl resistance activation 4 Auxiliary evaporator defrost 5 Pump down valve 6 Condenser fan 7 Delayed compressor 8 Do not select 9 Do not select 10 Do not select 11 Do not select 12 Do not select 13 Second compressor step 14 Second compressor step with rotation 15 Humidity output	1	0	15	-	I	62	R/W	36 46
H6	Terminal keys block configuration 0 = all keys enabled par. H6 FUNCTION 1 Set point modification 2 Defrost 4 - 8 AUX1 output 16 Multifunction menu (HACCP) 32 AUX2 output 64 On/Off management 128 Light management	0	0	255	-	I	70	R/W	35
HO1	Output Y1 configuration 0 Not active 1 Do not select 2 Variable speed evaporator fans set on Sd probe	0	0	2	-	I	63	R/W	36 41 42
HcP									
HCE	Enable HACCP 0/1 = No/Yes	0	0	1	-	D	22	R/W	54
Htd	HACCP alarm delay	0	0	250	min	I	71	R/W	54
rtc									
tcE	Enable data modification 0/1 = no/ yes	0	0	1	-	D	24	R/W	21
tcT	Date/ time change Action on variation 0→1 o 1→0	0	0	1	-	D	25	R/W	21
y__	Date/ time: year	0	0	37	-	I	98	R/W	21

Par.	Description	Def	Min	Max	UOM	Type	CAREL SVP	R/W	page
M__	Date/ time: month	1	1	12	-	I	99	R/W	21
d__	Date/ time : day of month	1	1	31	-	I	100	R/W	21
h__	Date/ time: hour	0	0	23	-	I	101	R/W	21
n__	Date/ time: minute	0	0	59	-	I	102	R/W	21
tcL	Hours/minutes visualization on the second row for models with two rows display 0/1=no/yes	0	0	1	-	D	72	R/W	
ddi	Defrost i (i=1…8): day	0	0	11	day	I	103…110	R/W	39
hhi	Defrost i (i=1…8): hour	0	0	23	hour	I	111…118	R/W	39
nni	Defrost i (i=1…8): minute	0	0	59	min	I	119…126	R/W	39
doL									
c12	Compressor safety time for door switch 0 = disable door management	0	0	5	min	I	64	R/W	33
d8d	Compressor restart time for door switch	0	0	240	min	I	65	R/W	33
tLi	Light on with door open	120	0	240	min	I	66	R/W	34
A4	Light management 0 = door switch + light key - 1 = light key	0	0	1	-	D	18	R/W	34
rcP (see charter 3 the procedure for setting parameters to default values)									
Eud									
P1	Enable communication with Evd module 0/1=no/yes	0	0	1	-			R/W	
P1t	S1 probe type	0	0	3	-	I	139	R/W	
P1M	Max value of S1 probe	9,3	-20	200	°C/°F	A	31	R/W	
P1n	Min value of S1 probe	-1	-20	200	°C/°F	A	30	R/W	
PVt	Valve type	1	1	22	-	I	136	R/W	
PH	Refrigerant type	2	0	24	-	I	135	R/W	
PrE	Main regulation type	2	1	4	-	I	137	R/W	
P0	EVD ModBus address	198	1	247	-	I	134	R/W	
P3	Superheat setpoint	10	-72	324	K	A	44	R/W	
P4	Proportional gain	15	0	800	-	A	36	R/W	
P5	Integral time	150	0	999	sec	A	148	R/W	
P6	Derivative time	2	0	800	sec	A	37	R/W	
P7	LowSH: threshold low superheat	3	-72	324	K	A	45	R/W	
P8	Low Superheat protection integral time	600	0	800	sec	A	38	R/W	
P9	LowSH: low superheat alarm delay	600	0	999	sec	A	150	R/W	
PL1	LOP: threshold for low temperature of evaporation	-50	-76	392	°C/°F	A	64	R/W	
PL2	Low Superheat protection integral time	600	0	800	sec	A	39	R/W	
PL3	LOP: low evaporation temperature alarm delay	600	0	999	sec	A	151	R/W	
cP1	Open valve startup, Percentage	50	0	100	%	A	146	R/W	
Pdd	Post defrost delay [min], only for single driver	10	0	60	min	A	147	R/W	
PSb	Valve position in stand-by	0	0	100	step	A	169	R/W	
PMP	Enable manual positioning	0	0	1	-	D	103	R/W	
HACCP alarms (MULTIFUNCTION MENU)									
HA	Date/time of last HA alarm: day	-	1	7	day	I	72	R	52
	Date/time of last HA alarm: hour	-	1	23	hour	I	73	R	52
	Date/time of last HA alarm:minute	-	1	59	min	I	74	R	52
HA1	Date/time of second last HA alarm: day	-	1	7	day	I	75	R	52
	Date/time of second last HA alarm: hour	-	1	23	hour	I	76	R	52
	Date/time of second last HA alarm:minute	-	1	59	min	I	77	R	52
HA2	Date/time of third last HA alarm: day	-	1	7	day	I	78	R	52
	Date/time of third last HA alarm: hour	-	1	23	hour	I	79	R	52
	Date/time of third last HA alarm:minute	-	1	59	min	I	80	R	52
HAn	Number of HA alarms	-	1	15	-	I	96	R	52
HF	Date/time of last HF alarm: hour	-	1	7	day	I	81	R	52
	Date/time of last HF alarm: hour	-	1	23	hour	I	82	R	52
	Date/time of last HF alarm:minute	-	1	59	min	I	83	R	52
HF1	Date/time of second last HF alarm: day	-	1	7	day	I	86	R	52
	Date/time of second last HF alarm: hour	-	1	23	hour	I	87	R	52
	Date/time of second last HF alarm:minute	-	1	59	min	I	88	R	52
HF2	Date/time of third last HF alarm: day	-	1	7	day	I	91	R	52
	Date/time of third last HF alarm: hour	-	1	23	hour	I	92	R	52
	Date/time of third last HF alarm: minute	-	1	59	min	I	93	R	52
HFn	Number of HF alarms	-	1	15	-	I	97	R	52
Hcr	Reset HACCP alarms (1 = reset)	0	0	1	-	D	23	R/W	52

Tab. 7.a

8. SIGNALS AND ALARMS

8.1 Signalling

The signals are messages that appear on the display to notify the user regarding the performance of control procedures (such as defrost) or confirmation of controls from keyboard.

Code	Description
---	It appears at controller start-up
---	Probe not enabled

Parameters categories	
Pro	Probes
CtL	Control
CMP	Compressor
dEF	Defrost
ALM	Alarm
Fan	Fan
CnF	Configuration
HcP	HACCP
rtc	Clock
rcP	Recipes
Evd	EVD Evo

Messages that appear during navigation	
PAS	Password
HA	HACCP alarm, HA type
HF	HACCP alarm, HF type
rES	Reset alarms with manual reset Reset HACCP alarms Reset temperature monitoring
cc	Continuous cycle
Ed1	Defrost on evaporator 1 ended by time-out
Ed2	Defrost on evaporator 2 ended by time-out
On	Switch ON
OFF	Switch OFF
AUX	Auxiliary output switch on request
rEc	Temperature registration
no	Operation not executed
uPd	Parameters upload
dnL	Parameters download
bni	Menu parameters set (bn)
r01…r10	Recipe 1…10
MAX	Maximum temperature read
MIN	Minimum temperature read
Op	Open
cLo	Closed
EXT	Exit menu
Hcr	Reset HACCP alarms
VEr	Software version

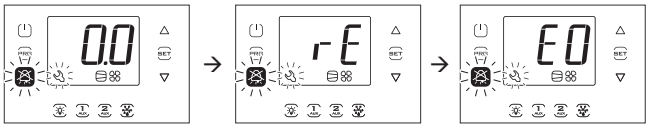
Tab. 8.a

8.2 Alarms

There are two types of alarms:
- system alarms: e.g. Eeprom alarms, communication (interrupted) alarms, HACCP, high (HI) and low (LO) temperature alarms;
- control alarms: e.g. pump down ended by time-out (Pd), low pressure (LP).

The alarm for damaged data inside EE/EF memory generates control block. The auxiliary digital outputs AUX1, AUX2 can be configured to signal the alarm status, as normally energised or normally de-energised. See chapter 5. The control indicates the alarms triggered due to faults in the control itself, in the probes or in the network communication. You can also activate an alarm from external contact, immediate type. See chapter 4. On the display the message "IA" appears and at the same time the bell icon blinks and the buzzer activates. If more errors occur, they will appear in sequence on the display.

Example: display after alarms rE and E0.



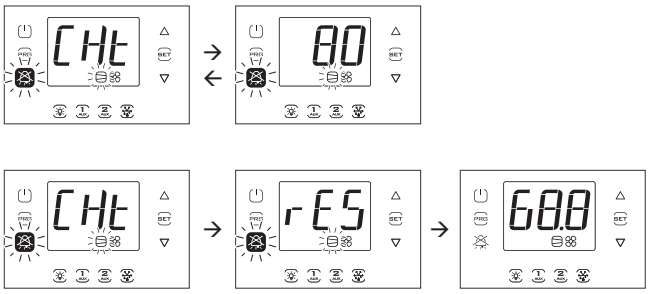
Note: in order to deactivate the buzzer and the relay alarm press the Alarm key

Note: the figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, the display shows the alarm messages on the second row.

8.3 Reset alarms

Alarms with automatic reset automatically reset when the cause that generated them, for example, after the replacement of a faulty probe, at the end of the alarm for high temperature, etc. For those with manual reset it is necessary to first remove the cause that generated them, and then press the Alarm button for entire restore.

Example: display and manual restore alarm CHt (condenser high temperature)



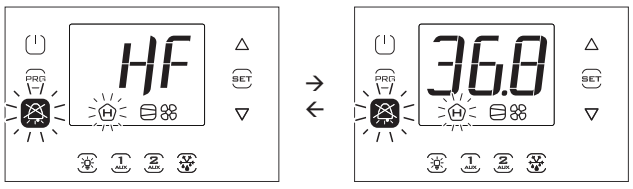
Note: the figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, the display shows the alarm messages on the second row

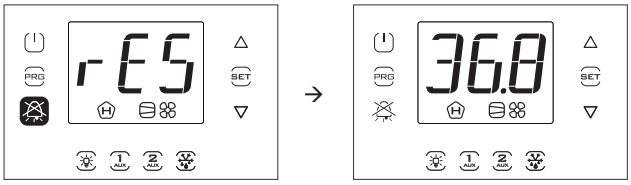
8.4 HACCP alarms and display

In order to activate monitoring see par 8.6
(HACCP = Hazard Analysis and Critical Control Point).
HACCP can only be activated on the controllers with the RTC option fitted, and allows control of the operating temperature and the recording of any anomalies due to power failures or increases in the operating temperature due to various causes (breakages, severe operating conditions, operator errors, etc…). There are two types of HACCP events:
- HA alarms, high temperature during operation;
- HF alarms, high temperature after power black out.

The alarm causes the blinking of HACCP icon, the display of the relative alarm code on the display, storage of the alarm and activation of the buzzer.

Example: display after HF error and restore of the alarm condition:





Note: the figures refer to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, the display shows the alarm messages on the second row

Display and cancel HACCP alarms

Access the multifunction menu (see chap. 3) and choose HcP. In the multifunction menu you can see the date and time of the last 3 alarms HA and HF. After entering the multifunction menu (see previous par.), select with UP / DOWN the message "HCP".

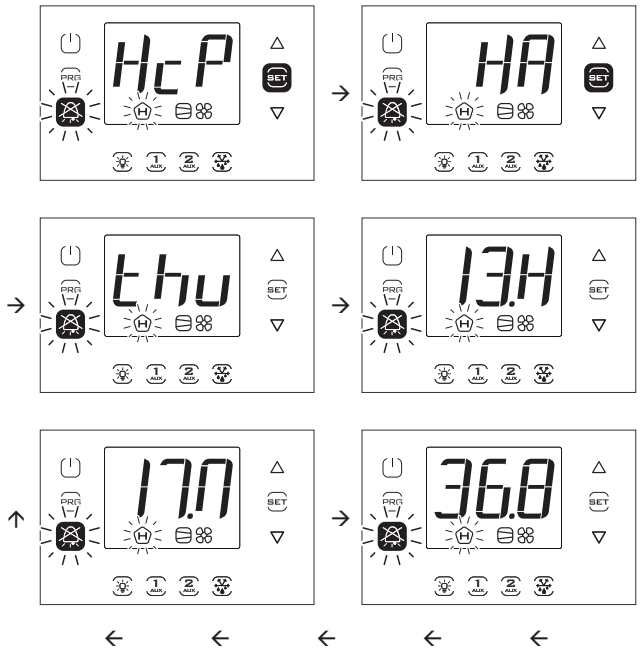
Par.	Description	Def	Min	Max	U.M.
HA	Date/time of last HA alarm	0	-	-	-
HA1	Date/time of second last HA alarm	0	-	-	-
HA2	Date/time of third last HA alarm	0	-	-	-
HAn	Number of HA alarms	0	0	15	-
HF	Date/time of last HF alarm	0	-	-	-
HF1	Date/time of second last HF alarm	0	-	-	-
HF2	Date/time of third last HF alarm	0	-	-	-
HFn	Number of HF alarms	0	0	15	-
Hcr	HACCP alarms cancelling Action on variation 0→1 o 1→0	0	0	1	-

Procedure:

1. Press Set and then UP/DOWN to display the parameters of the following table;
2. Press Set to display the alarm date and time;
3. Press Prg until you return to standard display.
4. To cancel all HACCP alarms, change the value of the parameter Hcr

Each alarm is displayed with scrolling text, which contains the day of week, hour, minute, and the temperature that caused the alarm. The buffer in which are saved can contain the data of up to 3 alarms. Once full, the new alarm will replace the oldest one. Instead, the alarm counters (HAn, HFn), after reaching 15, they stop.

Example: HA alarm triggered Thursday at 13:17, with detected temperature of 36.8 °C.



Note: the figure refers to the screens on models with single row display, P/Ns WB000S*. In models with two rows, P/Ns WB000D*, as well as the message indicated, during navigation the display shows the scrolling message "HACCP Alarms" on the second row.

8.5 EVD EVO alarms

If an Ultra EVD module, P/N WM00E%, is connected by Fieldbus, UltraCella will be able to signal the following alarms, which only depend on the status of the EVD EVO controller fitted on the module.

Alarm code on display	Alarm description	Icon flashing on display	Buzzer	Reset
SHA	Low superheat protection		ON	Automatic
LOA	LOP protection		ON	Automatic
MOA	MOP protection		ON	Automatic
EEA	Valve motor fault		ON	Automatic
LSA	Threshold and timeout exceeded		ON	Automatic
Hit	High condensing temperature protection activated		ON	Automatic
ES1	Probe S1 fault or set point exceeded		ON	Automatic
ES2	Probe S2 fault or set point exceeded		ON	Automatic
ES3	Probe S3 fault or set point exceeded		ON	Automatic
ES4	Probe S4 fault or set point exceeded		ON	Automatic
bAt	Battery discharged or faulty or electrical connection interrupted		ON	Automatic
EEE	Operating and/or parameter EEPROM error		ON	Automatic
EIC	Valve not closed completely		ON	Automatic
EEC	Valve closed in emergency		ON	Automatic
EFu	FW compatibility error (>=5.0)		ON	Automatic
ECn	Configuration error		ON	Automatic
ELE	EVD offline		ON	Automatic

Tab. 8.b

ALARM TABLE

Cod. display	Alarm cause	Icon on the display flashing	Display key flashing	Alarm relay	Buzzer	Reset	PD valve	Compressor	Defrost	Evaporator Fans	Condenser fans	Continuous cycle
rE	Virtual control probe fault			ON	ON	automatic	duty setting (c4)	duty setting (c4)	-	-	-	-
E0	Probe B1 fault			ON	ON	automatic	duty setting (c4)	duty setting (c4)	-	-	-	-
E1	Probe B2 fault			ON	ON	automatic	-	-	-	-	-	-
E2	Probe B3 fault			ON	ON	automatic	-	-	-	-	-	-
E3	Probe B4 fault			ON	ON	automatic	-	-	-	-	-	-
E4	Probe B5 fault			ON	ON	automatic						
---			NO	OFF	OFF	automatic	-	-	-	-	-	-
LO	Low temperature alarm	-		ON	ON	automatic	-	-	-	-	-	-
HI	High temperature alarm	-		ON	ON	automatic	-	-	-	-	-	-
IA	Immediate alarm from external contact	-		ON	ON	automatic	duty setting (A6)	duty setting (A6)	-	-	-	-
Pd	Maximum pump down time alarm	-		ON	ON	autom. / manual	-	-	-	-	-	-
LP	Low pressure alarm	-		ON	ON		OFF	OFF	-	-	-	-
AtS	Autostart in pump down	-		ON	ON	autom. / manual	-	-	-	-	-	-
CHt	High condenser temperature alarm	-		ON	ON	manual	OFF	OFF	-	-	-	-
dor	Door open too long alarm	-		ON	ON	automatic	-	-	-	-	-	-
Etc	Real time clock is broken			OFF	OFF	autom. / manual	-	-	-	-	-	-
EE	EEprom error, unit parameters			OFF	OFF	automatic	OFF	OFF	NO	OFF	OFF	NO
EF	Eeprom error, operating parameters			OFF	OFF	automatic	OFF	OFF	NO	OFF	OFF	NO
HA	HACCP alarm, HA type	-		OFF	OFF	manual	OFF	OFF	-	-	-	-
HF	HACCP alarm, HF type	-		OFF	OFF	manual	OFF	OFF	-	-	-	-
LOG	LOG fault			OFF	ON	automatic	-	-	-	-	-	-
uPL	Parameters upload fault			OFF	ON	automatic	-	-	-	-	-	-
dnL	Parameters download fault			OFF	ON	automatic	-	-	-	-	-	-
SHA	Low superheat protection			OFF	ON	automatic	OFF	OFF	-	-	-	-
LOA	LOP protection			OFF	ON	automatic	OFF	OFF	-	-	-	-
MOA	MOP protection			OFF	ON	automatic	OFF	OFF	-	-	-	-
EEA	Valve motor fault			OFF	ON	automatic	OFF	OFF	-	-	-	-
LSA	Threshold and timeout exceeded			OFF	ON	automatic	OFF	OFF	-	-	-	-
Hit	High condensing temperature protection activated			OFF	ON	automatic	OFF	OFF	-	-	-	-
ES1	Probe S1 fault or set point exceeded			OFF	ON	automatic	OFF	OFF	-	-	-	-
ES2	Probe S2 fault or set point exceeded			OFF	ON	automatic	OFF	OFF	-	-	-	-
ES3	Probe S3 fault or set point exceeded			OFF	ON	automatic	OFF	OFF	-	-	-	-
ES4	Probe S4 fault or set point exceeded			OFF	ON	automatic	OFF	OFF	-	-	-	-
bAt	Battery discharged or faulty or electrical connection interrupted			OFF	ON	automatic	OFF	OFF	-	-	-	-
EEE	Operating and/or parameter EEPROM error			OFF	ON	automatic	OFF	OFF	-	-	-	-
EIC	Valve not closed completely			OFF	ON	automatic	OFF	OFF	-	-	-	-
EEC	Valve closed in emergency			OFF	ON	automatic	OFF	OFF	-	-	-	-
EFu	FW compatibility error (>=5.0)			OFF	ON	automatic	OFF	OFF	-	-	-	-
ECn	Configuration error			OFF	ON	automatic	OFF	OFF	-	-	-	-
ELE	EVD offline			OFF	ON	automatic	OFF	OFF	-	-	-	-

Tab. 8.c

8.6 Alarm parameters

Alarm and activation parameters

AL (AH) allows you to determine the activation temperature for low (high) temperature alarm LO (HI). The set value AL (AH) is always compared with the value detected by the control probe. The parameter Ad represents the alarm activation delay in minutes; the low temperature alarm (LO) activates only if the temperature is lower than threshold AL for period of time greater than Ad. The thresholds can be relative or absolute, depending on the value of parameter A1. In the first case (A1=0) the value AL indicates the deviation regarding the set point and the low temperature alarm activation point is: set point - AL. If the set point differs, the activation point will automatically differ. In the second case (A1=1), the value AL indicates the low temperature alarm threshold. An active low temperature alarm is indicated via internal buzzer, with the code LO on display and with the activation of the alarm relay. The same occurs for high temperature alarm (HI), considering AH instead of AL.

Par	Description	Def	Min	Max	UM
A0	Alarm and fan differential	2.0	0.1	20.0	°C/°F
A1	Alarms threshold (AL, AH) relative to set point or absolute 0/1=relative/absolute	0	0	1	-
AL	Low temperature alarm threshold If A1= 0, AL=0: alarm disabled If A1= 1, AL=-50: alarm disabled	0	-50.0	200	°C/°F
AH	High temperature alarm threshold If A1= 0, AL=0: alarm disabled If A1= 1, AL=200: alarm disabled	0	-50.0	200	°C/°F
Ad	Delay time for low temperature and high temperature alarms	120	0	250	min
A6	Stop compressor from external alarm 0 = compressor always off; 100 = compressor always on;	0	0	100	min

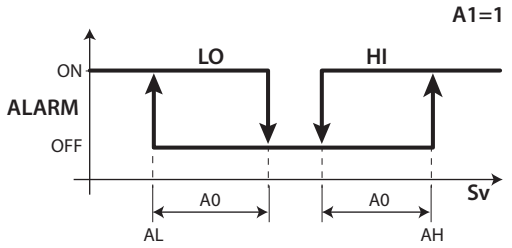


Fig. 8.a

Key

LO	Low temperature alarm
HI	High temperature alarm
SV	Adjustment probe

Notes:

- The alarm LO and HI are alarms with automatic reset. A0 determines the hysteresis between the value of the activation and deactivation of the alarm;
- if you press the Alarm button when the measurement is above a threshold, the buzzer and the alarm relay immediately turn off, and an indication of the alarm code will remain active until the measure falls within the activation threshold. Parameter A6 has similar meaning as parameter c4 (duty setting). If an external alarm occurs, the compressor works for a time equal to the value set for parameter A6, while it remains OFF for a fixed period of 15 minutes.
- In case of relative alarms (A1= 0) both AL and AH are considered as absolute values (e.g. AL= -10 is considered as AL= 10)

8.7 HACCP Alarm parameters and monitoring activation

In order to activate HACCP alarm monitoring, set parameter HCE=1.

HA alarms

The HA alarm is generated if during normal operation it is noted that the temperature read by the control probe exceeds the high temperature threshold for the time Ad + Htd. Therefore compared to the normal high temperature alarm already signalled by the control, HACCP alarm type HA is delayed by a further Htd time specific for HACCP recording.

Par.	Description	Def	Min	Max	U.M.
HCE	Enabling HACCP 0/1=No/Yes	0	0	1	-
Htd	HACCP alarm delay	0	0	250	min

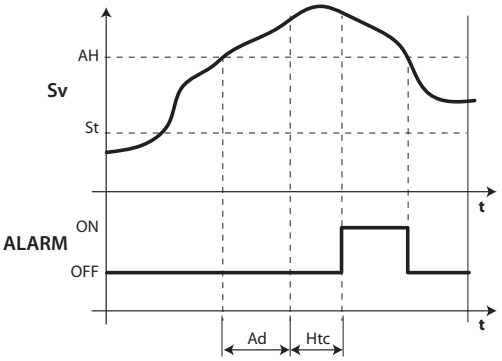


Fig. 8.b

Key

Sv	Virtual probe
St	Set point
t	Time
AH	High temperature alarm threshold
ALARM	HACCP alarm, HA type
Ad	Delay time for low temperature and high temperature alarms
Htd	HACCP alarm delay 0=monitoring disabled

HF alarms

The HACCP alarm type HF is generated as a result of a power failure for a long time (> 1 minute), when after mains voltage restore the temperature read by the adjustment probe exceeds the high temperature threshold AH .

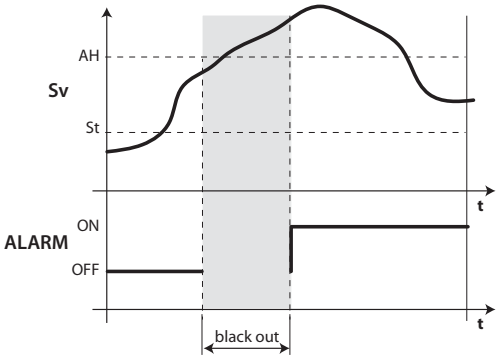


Fig. 8.c

Key

Sv	Virtual probe
AH	High temperature alarm threshold
ALARM	HACCP alarm, HF type
St	Set point
t	Time

8.8 High condenser temperature alarm

You can monitor the temperature of the condenser to signal the high temperature, probably due to situations of clogging. The signalling follows the figure below.

Par	Description	Def	Min	Max	UM
Ac	High condenser temperature alarm threshold	70	0	200	°C/°F
Acd	High condenser temperature alarm delay	0	0	250	min

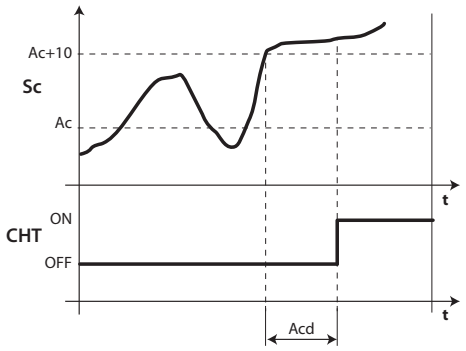


Fig. 8.d

Key

t	Time
Acd	High condenser temperature alarm delay
Sc	Condenser probe
Ac	High condenser temperature alarm threshold
CHT	High condenser temperature alarm

9. TECHNICAL SPECIFICATIONS

9.1 UltraCella technical characteristics

Power Supply:	Model 230V: Voltage 230 V~ (+10/-15%), 50/60 Hz; Power 18 VA, 100 mA~ max. Model 24V: Voltage 24 V~ (+10/-15%), 50/60 Hz; Power 18 VA, 1A~ max.		
Insulation ensured by 230V power supply	Insulation for low voltage: reinforced, 6 mm in air, 8 mm superficial, 3750 V. Insulation for relay outputs: reinforced, 3 mm in air, 4 mm superficial, 1250 V.		
Analog inputs	B1, B2, B3: NTC, PT1000 (+-3%) B4: NTC, 0...10Vdc (+-3%) B5: 0...5Vdc ratiometric (+-3%) , 4...20mA (+-3%)		
Analog output	Y1: 0...10 Vdc (10mA max,+-5%)		
Note:	When installing, keep the supply and loads connections away from the cables of the probes, digital inputs, and monitoring device.		
Probe Type	NTC std. CAREL: 10 kΩ at 25°C, range from -50°C to 90°C; measuring error: 1°C in range from -50°C to +50°C; 3°C in range from +50°C to +90°C NTC HT: 50 kΩ at 25°C, range from 0°C to 150°C; measuring error: 1.5°C in range from 0°C to +115°C; 4°C in range from +115°C to +150°C PT1000 std. CAREL: 1000 Ω at 0°C, range from –50°C to +90°C; measuring error 3°C in range from –50°C to 0°C; 5°C in range from 0°C to +90°C		
Probe power supply	+Vdc 12 V+-30%, 25 mA max; 5VREF: 5V+-2%		
Relay output	Applicable ratings based on the relay type		
	Type of Relay	EN60730 -1 (250 V ~)	UL 873 (250 V ~)
	8A (AUX1, AUX2)	8 (4)A on N.O.; 6 (4)A on N.C.; 2 (2)A on N.C. and N.O. (100000 cycles)	8A resistive 2FLA 12LRA, C300 (30000 cycles)
	16A,(LIGHT, FAN)	10A resistive, 5 (3)A (100000 cycles)	10A resistive, 5FLA 18LRA (30000 cycles)
	30A(COMP, DEF)	12 (10)A (100000 cycles)	12A resistive, 2HP, 12FLA 72LRA (30000 cycles)
	NOTE: The sum of the loads currents COMP, DEF, FAN accessed at the same time should not exceed 20A		
	Insulation for low voltage: reinforced, 6 mm in air, 8 superficial, 3750 V. Insulation between independent relay outputs: reinforced, 3 mm in air, 4 superficial, 1250 V.		
Connections	Section of conductors for analog inputs and outputs, digital inputs, serial: from 0.5 to 2.5mm2 (from 20 to 13 AWG); Section of supply and loads cables: from 1.5 to 2.5 mm2 (from 15 to 13 AWG) Serial connections:use shielded cables Maximum length of the cables: 10 m		
Container	Plastic: sizes 200 x 100 X 190 mm		
Assembly	On wall (with plastic container): using fastening screws for front board		
Display	LED display: 3 and 4 digits, display from -99 to 999; operating status indicated by LEDs and icons formed on the polycarbonate applied to the plastic		
Keyboard	10 keys on keyboard in polycarbonate membrane applied to the plastic		
Clock with buffer battery	Available depending on the model		
Buzzer	Available on all models.		
Clock	Depending on the model installed. Accuracy: ±100 ppm Battery: "button" type with lithium code CR2430 voltage: 3Vdc (sizes 24x3 mm)		
Serial	3 types of available serials: pLAN, BMS, Fieldbus PLAN : Driver HW RS485, telephone jack (available only on few models) and screw terminals BMS Driver HW RS485, screw terminals Fieldbus: Driver HW RS485, screw terminals		
USB	Type: Host (A connector); 5Vdc supply, maximum absorption: 100mA (low power devices)		

Operating conditions	Only board: -10T65°C; <90% U.R. non condensing With plastic container: -10T50°C, <90% U.R. non condensing Relay identification, type and maximum resistive current to operating temperature:

Relay	Associated load	Type of Relay	Max resistive current applicable
R1	(AUX2)	8A	8A
R2	(AUX1)	8A	8A
R3	(LIGHT)	16A	10A
R4	(FAN)	16A	10A
R5	(DEF)	30A	12A
R6	(COMP)	30A	12A

NOTE: The sum of the loads currents COMP, DEF, FAN accessed at the same time should not exceed 20A.

Storage conditions	-20T70°C, < 90% U.R. non condensing
Front protection rating	With plastic container: IP65
Environmental pollution	2, normal situation
PTI of the isolating materials	Printed circuits 250, plastic and insulation materials 175
Resistance to fire class:	Category D
Protection against overcharging class	Category II, without PE terminal Category I, with PE terminal
Type of action and disconnection	Relay contact 1 B (micro-disconnection)
Control system manufacture	Incorporated, electronic control device
Classification according to protection against electric shock	Class II by means of appropriate incorporation
Device intended to be hand-held or built into equipment designed to be hand held	No
Class and structure of the software	Class A
Control front cleaning	Only use neutral detergents and water

Tab. 9.a

Notes

Notes

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UltraCella +0300083EN - rel. 1.3 - 30.06.2014